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S. Hrg. 104–532, Pt. 2

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1997 AND THE FUTURE YEARS DEFENSE PROGRAM

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PT. 2
Department of Defense Authorization...

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED FOURTH CONGRESS

SECOND SESSION

ON

S. 1745

AUTHORIZING APPROPRIATIONS FOR FISCAL YEAR 1997 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEAR FOR THE ARMED FORCES, AND FOR OTHER PURPOSES

PART 2
SEAPOWER

MARCH 19, 21, 26, 27, 28, 1996

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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1997 AND THE FUTURE YEARS DEFENSE PROGRAM

TUESDAY, MARCH 19, 1996

U.S. SENATE,
SUBCOMMITTEE ON SEAPOWER,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

DEPARTMENT OF THE NAVY'S EXPEDITIONARY WARFARE PROGRAMS

The subcommittee met, pursuant to notice, at 8:32 a.m. in room SR–232A, Russell Senate Office Building, Senator William S. Cohen (chairman of the subcommittee) presiding.

Committee members present: Senators Cohen, (presiding), Warner, Kennedy, Robb, and Lieberman.

Committee staff members present: Romie L. Brownlee, staff director; and Christine K. Cimko, press secretary.

Professional staff member present: Steven C. Saulnier.

Minority staff members present: Creighton Greene, professional staff member.

Staff assistants present: Patricia L. Banks.

Committee members' assistants present: Judith A. Ansley, assistant to Senator Warner; Dale F. Gerry, assistant to Senator Cohen; Ann E. Sauer, assistant to Senator McCain; Thomas L. Lankford, assistant to Senator Smith; Steven A. Wolfe, assistant to Senator Kennedy; William Owens, assistant to Senator Robb; and John F. Lilley, assistant to Senator Lieberman.

OPENING STATEMENT OF SENATOR WILLIAM S. COHEN, CHAIRMAN

Senator COHEN. Good morning, gentlemen.

This morning the Senate Armed Services Subcommittee on Seapower meets to review expeditionary warfare programs contained in the Department of Navy's defense authorization request for fiscal 1997. Our emphasis this morning is going to be on programs associated with mine countermeasures, and our witnesses this morning are: Major General Jim Jones, United States Marine Corps, the Director of Expeditionary Warfare; Rear Admiral John Pearson, Commander, Mine Warfare Command; and Rear Admiral Rick Williams, Program Executive for Mine Warfare.

Although the naval forces performed extremely well during Desert Storm, a clear lesson learned was the limit that our Navy mine countermeasures capability placed on the commanders' operational options. Although the Iraqi mining capability was primitive at best, amphibious assault from the sea was ruled out because of, among other considerations, an inability to confidently provide lanes of approach clear of mines. Additionally, the only damage to Navy ships that occurred during Desert Shield and Desert Storm occurred as a result of mines.

In the years since Desert Storm, this committee has placed continuing emphasis on improving the Navy's mine countermeasures capability. As a consequence, there is a statutory requirement for the Secretary of Defense to submit an annual report that the Navy is pursuing a coherent MCM program that addresses the evolving threat and there are sufficient resources programmed in the future years defense program to execute the Navy's development and procurement plans.

The committee also initiated the creation of the Director for Expeditionary Warfare on the Chief of Naval Operations Staff to ensure that mine countermeasures and other programs associated with forcible entry from the sea were accorded adequate priority in the Navy's warfare assessment and resource allocation process.

I mention these committee initiatives, as well as the research and development funds that we have added periodically, to emphasize the committee's sustained interest in addressing mind countermeasures challenges that confront the Navy. We think this emphasis is particularly relevant in light of the Navy's strategic concept, articulated in "From the Sea" and "Forward From the Sea," that postulates warfare in littoral and near-land areas as the principal focus for naval operations in a post-Cold War world.

I think it is also worth noting that the Navy's historical track record on meeting the mine threat has been cyclical at best, characterized by periodic bursts of activity when a mine threat disrupted naval operations, such as Wonsan during the Korean War or during Desert Storm, with a subsequent inexorable decline as lessons learned have been forgotten.

Another important consideration is the constrained mission of port breakout that was assigned to the Navy's mine countermeasures during the Cold War. It was assumed that the offensive type of mine clearance needed for amphibious operations would be provided by our allies. Consequently, the MCM capabilities needed to support expeditionary warfare were ignored, neglected, or at best marginally funded in the competition for defense dollars.

Over 5 years have passed since Desert Storm. Our principal purpose today is to sample what progress the Navy has made in improving its mine warfare capabilities, what its priorities and programs are for the future, what shortfalls still exist, if any, that would limit the ability of naval forces to conduct an imposed amphibious assault, and whether the resources that have been included in this year's budget and future years defense programs are adequate.

Another area the committee has monitored for many years is the Navy's surface fire support capability. It is a capability that must be robust if naval forces are to conduct expeditionary warfare. Unfortunately, it has been neglected for a long time. Optimistic programs, many created in response to Congressional encouragement, have suffered from inadequate funding, a lack of commitment, and constant revision.

Last year the committee felt compelled to direct the Secretary of the Navy to retain two battleships that he had stricken from the Naval Register, because there were no other weapon systems available to fill the fire support void they could provide. The committee also added funding for improvements to the Navy's existing 5-inch naval gun and its ammunition because of the Navy's apparent commitment to carrying its latest programs through to conclusion. We want to take some time today to monitor the Navy's progress with its program for its 5-inch gun.

Our witnesses today are well qualified to address these issues. General Jones is the Director of Expeditionary Warfare, responsible for establishing the Department's program for mine countermeasures and its requirements for surface fire support. Admiral Pearson is the operational commander of the Navy's mine countermeasures forces and Admiral Williams is the acquisition executive who is responsible for the development and procurement of the Department's mine countermeasures systems. Admirals Pearson and Williams have been in their present assignments for several years, providing the Navy's mine countermeasures with continuing and consistent leadership that stands in contrast to the usual assignment pattern for flag officers.

Gentlemen, we welcome you and thank you for joining us today. I apologize for rushing through the opening statement, but we have been instructed to complete this hearing by 10 o'clock, when the full committee goes into session.

Senator Kennedy.

STATEMENT OF SENATOR EDWARD M. KENNEDY

Senator KENNEDY. Thank you very much, and I will rush through mine even more quickly.

The Chair has outlined the interest that this committee has had in this responsibility by establishing the position, authority, and responsibility that General Jones has now with the increasing of the funding, and also with the importance of the attention the committee has given in terms of the ship-to-shore firepower and support for Marine landing forces.

As the Chair has pointed out, this responsibility reaches even a higher level, I think, given the Navy's new Approach From the Sea, and I think we have three people here who have given a great deal of attention and focus to these responsibilities. We consider this a high priority. We look forward to the testimony.

We thank the Chair for having the hearing.

Senator COHEN. General Jones.

STATEMENT OF MAJ. GEN. JAMES L. JONES, USMC, DIRECTOR, EXPEDITIONARY WARFARE

General JONES. Thank you, Mr. Chairman.

As this committee knows better than anyone else, the N85 owes very existence to the Congress, and I would like to take a few minutes before talking about the subject at hand to talk about N85 in broader terms, and then say a few words about mine warfare and naval surface fires.

As you know, the billet Expeditionary Warfare, the Director of Expeditionary Warfare, was established roughly 3 years ago. We occupy ourselves with really everything that has to do with amphibious warfare, naval special warfare, maritime prepositioning, and mine warfare. As a subset of those areas, we are interested and do have both requirements and resources to address those issues, notably all of the amphibious ships, the unmanned aerial vehicle program, naval surface fires from a requirements standpoint alone, and a good deal of the resources that goes into mine warfare.

From a total obligation authority for fiscal year 1997, the Expeditionary Warfare Department has roughly $2.55 billion, or roughly 3.4 percent of the Department of the Navy's total obligation authority.

Senator COHEN. What was the percent, General?

General JONES. About 3.4, sir.

But the reason that there is an expeditionary warfare division within the Department is more than just programs. It recognizes and addresses a very critical need to recognize that we do deal in a world of crisis, of regional crisis, of tension in the littorals. We deal in a world which has seen since the end of World War Two approximately 300 military responses to crisis, 80 percent of which have been at least partially naval in character.

That is not likely to change, and the fundamental documents that you referenced, Mr. Chairman, in your opening statement, "Operational Maneuver from the Sea" and "Forward from the Sea," lay out the benchmark for proceeding in this type of direction.

As such, we have established N85 to be a very, very capable bridge by which the Navy and the Marine Corps communicate with one another, not only programmatically but conceptually, and how we do what it is the Nation expects us to do, how we train our forces, and how we bring concepts into reality.

The purpose today is to emphasize two things: mine warfare and naval surface fires. With regard to mine warfare, we have tried in the last year to develop a cohesive approach based on a concept-based requirements system which results in the formulation and creation of a campaign plan that has three principal components to it: a near-term plan which is focused on fiscal year 1996 and 1997; a mid-term plan which is focused on the 5 years in the defense plan going out to 2003; and then a longer range plan for the out years.

We have tried to bring together all of the elements within the mine warfare community in the Department of the Navy. By that I mean not just expeditionary warfare, but the fleet operators, the two gentlemen on either side of me, Program Executive Office and the Commander of the Mine Warfare Command, located in Ingleside.

We have reached out to the science and technology community to understand what it is they can do for us in mine warfare. We have also reached out to industry to develop a cohesive dialogue with them to make sure that we understand what the near-term and far-term technologies are. We have communicated with them on a regular basis to make sure they understand the direction that we are going in so that their channels and energies can be funneled appropriately.

We have been supported by the Commandant and the Chief of Naval Operations, who for the first time this year have both signed the mine warfare plan. Admiral Boorda has also penned his name to a document which is the benchmark for what we are doing in mine warfare. It gives the operational concepts and the vision for the future and gives us clear taskings as to how to proceed as we translate ideas into plans and plans into reality.

We are cautiously optimistic that this process is not going to be reversed and is not simply the product of a half a dozen people who happen to be cohesively engaged in this effort during the short period of time——

Senator COHEN. Why are you only cautiously optimistic and not optimistic?

General JONES. We are very optimistic.

We think that the foundation that we have laid with this campaign plan will last and serve as the guideline for our successors.

Fundamentally, what we are trying to do in mine warfare is take a very capable, dedicated force that has been provided for and established, which is located at Ingleside, and which Admiral Pearson will talk about in greater detail, but which remains very much an on-call 911 force which you call when you need it and then you wait for it to get there, and we are trying to transition that force into an organic capability where we will have a mix of dedicated and organic capabilities to respond to the needs of the fleet.

By some of the existing state of the art technologies, we are going to be able to this year deploy a battle group with its own onboard minehunting capability. This is a first, and this is very exciting and very good news, I think, for the fleet and for those of us who worry about crisis response in the littorals.

Mines are everybody's concern. It should not be simply the province of a dedicated force located at Ingleside, Texas. It is Admiral Boorda's wish that we mainstream mine warfare in the minds of our warfighters and it will be the responsibility and the preoccupation of our commanders out at sea to understand and to be able to operate in the environment that they are in and to have the capabilities on board to be able to assess that environment in such a way that they do not either have to stop what they are doing to wait for the on-call force and they can actually deal with the environment wherever they are located.

With regard to naval surface fires, let me just say that this is a capability gap that both the Navy and the Marine Corps recognize. We are actively engaged in developing a combination of systems that will be mutually complementary to support the landing force, from guns to missiles to aviation.

I think Admiral Boorda has probably talked about his vision of the arsenal ship, which would be the modern replacement for the battleship, and we are excited about not only the level of dialogue that is ongoing on this subject, but also the commitment that is being made at the very highest levels of both services and the Secretary of the Navy to bring this capability gap into a real programmatic in the near future, to remedy what has been a critical gap for a considerable period of time.

N85 brings all of these things together. It is, as I said, the bridge on which the Navy and the Marine Corps can dialogue and can discuss these issues, and we are excited about that possibility of the future, particularly in mine warfare and naval surface fires, that we can, through articulate campaign planning and intelligent use of our resources, can bring about a new capability in both of these areas in the near future.

Thank you, Mr. Chairman.

[The prepared statement of General Jones follows:]

Prepared Statement by Maj. Gen. James L. Jones Jr.

EXPEDITIONARY WARFARE: NINE COUNTERMEASURES AND POWER PROJECTION—INTRODUCTION

As articulated by the Chief of Naval Operations and the Commandant of the Marine Corps in jointly-prepared whitepapers entitled *From the Sea . . .* and the subsequent *Forward, From the Sea . . .* the Naval service is our nation's preeminent expeditionary warfare force. The role of naval expeditionary warfare forces is to respond to chaos and crisis in the littoral regions of the world. The fundamental concept of Naval expeditionary doctrine involves the capability to project power ashore from the sea at the place and time of our choosing and to then sustain the buildup of our combat forces ashore. To support national policy, naval expeditionary warfare forces must resolve existing capability gaps in two critical warfare areas; mine countermeasures (MCM) and naval surface fire support (NSFS).

Mine Countermeasures

In terms of cost effectiveness and impact on the littoral environment, mines are one of the single most attractive weapons available to third world nations for the purpose of preventing U.S. naval expeditionary operations. For the foreseeable future we must anticipate a continued increase in both the lethality of mines and the number of mines available for use by practically any adversary. We have seen a 50 percent increase in worldwide mine production and demand since Desert Storm. Mines need not sink one or more of our warships or logistic vessels in order to be effective; they need only prevent us freedom of movement upon the sea which is the foundation of our expeditionary strategy. Relatively inexpensive and easily available to potential adversaries, mines can profoundly affect our military options either overtly or "psychologically." They can influence any future battlespace by channeling, blocking, deflecting, disrupting or delaying our power-projection forces. They can, if not countered, further exclude us from areas to which we may be called to achieve stated political and/or military objectives. Their potential to disrupt the flow of seaborne materials, equipment, fuels and other logistic supplies critical to the sustainment of forward combat operations, especially from the viewpoint of support of future distant regional conflicts, can become strategically important. Recognizing the pivotal importance of mine countermeasures, the Navy has developed, implemented, and funded programs which are resulting, despite the inherent difficulties of this particular aspect of Naval warfare, in our ability today to describe the status of mine counter-measures as a "good news story."

Starting with our existing, highly capable, dedicated mine countermeasures force, we have taken a number of far reaching steps to upgrade our mine countermeasures (MCM) capabilities to meet existing and emergent mine threats. By integrating the varied but quite complementary capabilities of our surface ship, airborne, and diver forces, the ability to conduct such operations has been significantly enhanced. Fourteen modern Avenger class (MCM–1) Minesweepers and five of twelve planned Osprey class (MHC–51) Minehunters are now operational and bring a superb and sustainable surface-borne MCM capability to our forces. Recent initiatives to forward deploy selected MCM ships to two of our high priority theaters will further increase their utility to on-scene commanders responsible for ensuring unimpeded movement through some of the world's most strategic waterways. Similarly, our airborne (AMCM) forces constitute a powerful and unique MCM capability which can quickly be transported to potential trouble areas around the world to bolster other MCM assets and greatly accelerate MCM operations. Finally, the diving arm of our mine countermeasures force, the Explosive Ordnance Disposal (EOD) teams, together with their associated marine mammal and other technical systems, give our Naval forces a powerful localized mine clearance capability when integrated with surface and airborne assets.

As capable as our dedicated mine countermeasures forces are, the Navy recognizes that expeditionary mine warfare requires new organic mine countermeasures capabilities as well as a new mine countermeasures "mind set" among naval forces to provide the unencumbered maneuver required by naval expeditionary warfare forces. The Chief of Naval Operations directed the creation of a Mine Warfare Campaign Plan to specify directed actions to address solutions to mine countermeasure gaps and shortfalls in the near-, mid- and long-term. The identification of mine countermeasure shortfall areas followed a rigorous analysis of the capabilities, systems and architecture required to perform expeditionary mine warfare; this effort was formalized and documented in the 1996–1997 Mine Warfare Plan. The near-term portion of the Campaign Plan identified a number of specific areas where directed investment would result in the delivery of substantive mine countermeasures improvements to our Naval forces during fiscal years 1996 and 1997; specifically these areas were:

- Dedicated MCM force readiness and sustainability: Addressed by accelerating SMCM engine alterations, AMCM engine overhauls and digital sonar improvements.
- Very shallow water (VSW) mine reconnaissance: Addressed by forming a VSW RECON unit with EOD, Navy Seal, Marine Corps RECON swimmers and marine mammals for contingency operations.
- MCM-resolution digital route surveys and environmental databases: Addressed by leveraging the survey, supercomputer and database assets of the Naval Oceanographic Office to develop MCM-specific, high-resolution databases.
- Implement organic MCM capabilities: Addressed by accelerating the fleet delivery of the organic Remote Minehunting System Remote Operated Vehicle (ROV) and fielding a fleet-based airborne laser minehunting system for contingency operations.
- MCM Command, control, communication, computers and intelligence (C^4I) improvements: Addressed by upgrading EOD mobile communications, funding data links for AMCM aircraft and fielding a deployable C^4I van.
- Formation of a rigorous, quantitative MCM Fleet exercise program: Addressed by instituting the fleet-based Mine Warfare Readiness Effectiveness Measurement (MWREM) program to integrate MCM operations into fleet exercises.

The overall philosophy used to correct identified shortfalls was based on three principal pillars: (a) solutions had to fill legitimate identified gaps, (b) investments should, where possible, accelerate the delivery of available high-payoff solutions to identified shortfalls, and (c) solutions were to maximize the integration of MIW into Naval operations. Based on this objective framework, Process Development Teams produced a set of near-term solution categories which addressed readiness and sustainability problems, capability shortfalls and infrastructure impediments. The solutions which addressed the specific areas delineated above were funded through a combination of reprogramming of existing mine warfare funds or through the addition of new funds into the Mine Warfare TOA.

The near-term Campaign Plan philosophy was continued in the mid-term portion of the plan (fiscal year 1998–2003) as well as in the far-term portion (2003+) of the plan. For the mid-term process, priority was given to finalizing the correction of dedicated MCM force readiness and sustainability issues and to the continuation of the initiatives begun in the near-term; solutions to address remaining shortfall areas and/or modernize the MCM forces were also prioritized. The far-term portion of the Campaign Plan calls for frequent and strengthened liaison between OPNAV mine warfare sponsors, mine warfare operators, program managers and principals within the S&T community to ensure that research and development efforts are focused to deliver robust solutions to mine countermeasures problems. Together, the Mine Warfare plan and the associated Mine Warfare Campaign Plan strategy represent a logical, affordable, realistic and consistent approach to identifying shortfall areas within mine countermeasures and to then identify specific actions and resources required to address them.

Equally, or perhaps even more importantly, than the directed analyses and actions contained in the Mine Warfare Plan and the campaign plan, is the heightened awareness of mine warfare issues within the Naval service. The Mine Warfare Plan is now signed jointly by the Chief of Naval Operations and the Commandant of the Marine Corps; a firm indicator as to its priority. Similarly, the recent CNO Whitepaper on mine warfare identifies "mine consciousness" as the sea-change needed to ensure its continuing evolution as a major contributor to the success of Navy and Marine Corps Expeditionary Warfare. The Naval service is committed to ensuring that mine warfare and mine countermeasures is placed and remains in the forefront and "mainstream" of naval operations.

Naval Surface Fire Support

Gaps in our naval surface fire support capability must also be corrected if naval expeditionary warfare forces are to effectively conduct operations in the littorals. Although N85 (the Expeditionary Warfare Division on the staff of the Chief of Naval Operations) is not tasked specifically with resource sponsorship of NSFS, we are clearly tasked with the responsibility to be the requirements advocate for this important component of Expeditionary Warfare. Accordingly, we act in concert with other OPNAV sponsors to achieve the Chief of Naval Operations objective to: "provide responsive, around the clock supporting arms fires in direct support of combat ashore." As is presently acknowledged, our fielded NSFS capability lacks the range (a current maximum of approximately 13 nautical miles), accuracy, and lethality to support the Navy-Marine Corps concept embodied in *Forward, From the Sea . . .* or in the evolving Marine Corps' concept of Operational Maneuver from the Sea (OMFTS). Based upon these operational constructs, the requirements for improved NSFS capabilities, can, as with our approach to mine countermeasures, be broken into near- and far-term objectives. Under this format, the near-term requirement for NSFS is to provide fire support from the sea prior to the introduction of Marines ashore, or until Marine artillery can be shore based at which time Navy and Marine Corps systems become complementary to one another. Effectively, this has the effect of stipulating a threshold range for NSFS of 41.3 nautical miles and an objective range, which includes the ability to conduct enemy counter-battery fire, of 63.1 nautical miles. As he did in response to the mine countermeasures problem, the Chief of Naval Operations directed a phased approach in meeting these demanding requirements. In the near-term, the Navy is to improve NSFS capability within the FYDP by improving the existing 5" gun system (via structural modifications, advanced propellant, etc.), developing Extended Range Guided Munitions (ERGMs), and to leverage/integrate C^4I systems to support NSFS. For the mid- to far-term, the Naval services are developing a Campaign Plan, based on the successful example of the Mine Countermeasures Campaign Plan, to determine future requirements, continue the analyses of strike missile demonstrations to select the best suitable option for a missile requirement, and to integrate C^4I/targeting with emerging concepts and doctrine.

CONCLUSION

The fundamental expeditionary force-oriented strategy embodied both in *Forward From the Sea . . .* and in the Marine Corps concept of Operational Maneuver from the Sea requires, as a minimum, absolute unencumbered freedom of movement upon the seas and the ability to sustain, from the sea, the build-up of our combat forces ashore. These attributes are necessarily complementary; they are in fact the logical result of deliberative analyses of the minimum requirements necessary to achieve success in such endeavors. Accordingly, the Naval service has made, is making, and will continue to make advances in those particular venues of Expeditionary Warfare necessary to achieve our national military objectives.

Our mine countermeasures forces routinely exercise their capabilities which are good and improving; future planned and budgeted advances will accelerate these capabilities. Fundamental to this is the understanding and acceptance by all Naval forces that mine warfare is "everybody's problem;" the days of delaying operations while awaiting dedicated mine warfare experts are waning—today we're all mine warriors. Similarly, the projection of firepower by naval surface vessels via NSFS is a prime component of naval strategy and the Expeditionary Warfare Division will continue to be a principal advocate of this critical venture.

Senator COHEN. Thank you, General Jones.
Admiral Pearson.

STATEMENT OF REAR ADM. JOHN O. PEARSON, USN, COMMANDER, MINE WARFARE COMMAND

Admiral PEARSON. Thank you, Mr. Chairman. I appreciate the opportunity to appear before the subcommittee today. I have not submitted a statement for the record, but I would like to make a few opening remarks and give you what I would consider an operational fleet view of the status of the Navy's mine warfare force.

I would say it is my firm belief that our Navy mine warfare force is presently the best in the world today. Now, obviously as the presiding commander of the force it would be in my best interest to say that, but I hope that I can give you a few of our operational exercise results from among many that will demonstrate the validity of that assertion.

Let me start with our mining area. We have an ample inventory of U.S. Navy sea mines to support theater CINC requirements. We are able to deliver them on short notice and in ample time for operational tasking by the theater CINC's.

But of course our focus here is more directed towards mine countermeasures. There has basically been a renaissance in our mine countermeasures capability since Desert Storm. It comes from two primary facets: Number one, we have effectively implemented the Desert Storm lessons learned; and number two, we have learned a great deal and developed a number of tactics, techniques and procedures that allow us to most effectively integrate and realize great synergy from the combination of the three elements of our mine countermeasures force, that is our ships, our helicopters, and our divers along with their mammals.

From the Desert Storm lessons learned, we learned back then that we needed to place all of our forces under one operational commander, that is the commander of the mine warfare command, which we had not done before, to allow for a very focused and comprehensive training and readiness oversight. We now have, which we did not have before, two deployable mine countermeasures command staffs that are available and conduct training exercise oversight on a worldwide basis and are also available for rapid deployment in the event of a real world contingency.

We are very near the completion of the conversion of USS INCHON to become the mine countermeasures command and support ship. We have forward presence in the world now, with two ships in the Western Pacific that have been there for approximately a year and a half, developing allied interoperability with the Republic of Korea Navy and the Japanese Maritime Self-Defense Force.

Within 7 days we are going to have two ships in the Arabian Gulf to develop that same type of interoperability in that arena. So we have forward presence in the two most likely theaters of conflict as of today and within a week.

Now let me get to some of the operational results that I talked about earlier. We have participated in a significant number of exercises over the last 3 years. Typically, these exercises were done in an operational scenario involving battle groups and amphibious forces. Additionally, we have participated in a number of significant exercises with our allies. In 9 of 12 of these major exercises, our mine clearance rate exceeded 90 percent.

In the most challenging scenario that we can come up with, competing with Northern European nations, which have generally been regarded as the best in the world, we have done two exercises, one in 1993, the Blue Harrier exercises, which is the largest mine countermeasures exercise in the world, involving about eight NATO countries and 400 exercise mines. In 1993, in the area of U.S. responsibility we cleared 100 percent of the exercise mines, plus two exercise mines from previous years' exercises, plus three World War Two mines.

Again, when we came back in 1995 for the same exercise we had a clearance level of 95 percent, compared with the overall NATO force clearance rate of 89 percent.

So I feel that these operational exercise results amply demonstrate my previous assertion that we are best in the world. That is not to say that we do not recognize that we need continuing improvement in some areas, and I believe that the leadership that General Jones has provided in putting together the mine warfare plan and our campaign plan will provide us with a focused, comprehensive plan to continue improvements necessary to meet our future requirements.

Thank you, sir.

Senator COHEN. Thank you very much, Admiral.

Admiral Williams.

STATEMENT OF REAR ADM. RICHARD D. WILLIAMS, III, USN, PROGRAM EXECUTIVE OFFICER FOR MINE WARFARE

Admiral WILLIAMS. Thank you, Mr. Chairman. I am honored to be invited to give testimony concerning the state of mine warfare. I have a statement that I would like to submit for the record. If that is satisfactory, I will summarize that statement.

I would like to cover what the Program Executive Office is, what we have done, and what we are committed to do. In October of 1992 the Program Executive Office for Mine Warfare was established to focus all acquisition responsibility for mine programs under a single manager reporting directly to the assistant Secretary of the Navy for Research, Development, and Acquisition.

The Program Executive Officer is the only U.S. Navy flag office in Washington who does nothing but mine warfare. There are two basic elements to my job: First, I buy the things that the operator needs once the requirements and priorities and budgets have been set; and second, in matters pertaining to in-service support of the mine warfare forces, I report to the Chief of Naval Operations via the Naval Sea Systems Command for support of those systems throughout their life.

Originally when the Program Executive Office was organized, I was basically responsible for those systems that were involved in mine countermeasures, as well as the Navy's mine programs. This last February my responsibilities were extended to include the two classes of ships, the MCM–1 class of mine countermeasures ships and the MHC–51 class of coastal minehunters.

My responsibilities for in-service support will expand further to include the U.S.S. *Inchon*, the mine support ship, when she returns to the fleet later this year.

Since Operation Desert Storm, the following acquisition activities have occurred: All 14 of the MCM ships have been delivered to the fleet and 6 of the 12 coastal minehunters have been delivered. As you have already heard, the U.S.S. *Inchon* will be delivered later this year. A remote minehunting system has been developed and tested in a fleet exercise and, as General Jones mentioned, is potentially going to go with a battle group later this year.

Shipboard and aviation training systems have been developed and tested. We have upgraded and standardized navigation systems and sonars on both classes of ships. Our forward deployed ships have received improved command, control, and communications equipment. A new lightweight variable depth mechanical minesweeping system is in low rate of initial production. Our air program minesweeping sleds and sonars have been improved and are being delivered.

With Congressional support and direction, we have successfully demonstrated the capability of laser-based systems to detect mines in the top layer of the water volume, and we are developing a world-class modeling and simulation capability for mine warfare which supports acquisition decisions, assessments, operational planning, and war-gaming.

A wide range of testing has been conducted to support development of explosives systems capable of dealing with shallow water and surf zone mine and obstacle clearance.

In our life cycle responsibilities, we have approached that in various ways. We have put a robust tracking system in place to monitor fleet problems. We have worked closely with Commander, Mine Warfare Command, in conducting local conferences to bring the fleet operators in direct contact with technical and logistics support establishments.

We have a small group of highly trained engineers, including contractors, on site down in Ingleside to support the ships directly, as well as to support the shore maintenance infrastructure.

We have coordinated all these activities directly with the fleet to make sure we are not duplicating things.

The culmination of all these actions, we have had some success in the various problems that you normally would run into with new ship classes as you begin to introduce them to the fleet and place demands on them. We have resolved a major spare parts problem on the Isotta-Fraschini main engines. We found a second source of supply for over 90 percent of the problem parts and brought the average supply delay time from 521 to 240 hours.

We have improved the reliability of the main engines from a low of 56 percent in 1993 to a December 1995 level of 72 percent, which is only a small percentage less than the normal availability of ships that have been in commission much longer.

We moved the main engine depot repair facility from Long Beach Naval Shipyard down to Ingleside. An automated data processing system has been installed on all the MCM's to improve administrative supply and maintenance functions, and similar installations are scheduled for the MHC's.

We have greatly improved quality, accuracy, and completeness of tech manuals, including fault isolation and repair capability. We will release new interactive electronic technical manuals for our major systems next year.

In response to House Report 104–208, encouraging the Navy to develop an integrated combat system, our proposed Integrated Combat Weapons System Block 0 will eliminate 788 costly, outdated electronic modules and replace them with 53 state of the art modules.

The Integrated Combat Weapons System will host the MCM and MHC navigation and neutralization systems on standard, state of the art open architecture consoles and will reduce the number of these consoles from five different ones to one that is in common use for all five previous usage. It will reduce the lowest repairable units by 75 percent and the spares needed by 70 percent, and we estimate a life cycle cost avoidance of $400 million for this system.

Operational commanders will likewise benefit with improved connectivity, improved coordination, and increased survivability, as the consoles will now be reconfigurable to other uses.

As we look toward the future, we have worked closely with General Jones in N85 and Commander, Mine Warfare Command, to reach the most realistic achievable direction in which to proceed. The near-term campaign plan is a perfect example of that. To support the campaign plan, we have undertaken the following efforts: to provide an environmental monitoring system to assist ships in getting the environmental information necessary for the optimum sonar settings; a deployment contingency version of Magic Lantern, a laser-based mine search system will soon be fielded on the SH–2 Golf helicopters; a prototype remote minehunting system is being considered for deployment, as you have already heard from General Jones; and identified gaps in the campaign plan in connectivity between the explosive ordnance disposal units and airborne mine countermeasures units are being worked in close coordination with the Commander, Space and Naval Warfare Systems Command.

We are developing a working architecture and ultimately a command, control computers and intelligence master plan for all mine warfare forces, to include connectivity with allies as well as training connectivities.

We are working the development of an improved sonar to greatly increase coverage rates. The airborne laser mine detection system, we are looking to incorporate that on the SH–60 Golf to give fleet units a laser detection capability for mines; and a mine neutralization system to neutralize both bottom and moored mines.

I am the technical project officer for 14 countries and the United States to exchange data on mine warfare systems. These data exchanges cover everything from sharing of research and development information up to mutually supportive programs.

I see mine warfare as a great opportunity. While sea mines and the environment in which they are found provide significant challenges, many needs are straightforward and within current technology horizons. The Mine Warfare Center of Excellence in Ingleside, Texas, offers great opportunity to structure the right size and the right type support organizations to best support the best mine warfare forces in the world. The single focus of Ingleside on mine warfare provides an opportunity for non-parochial, non-stovepiped, out of the box thinking to do smart things as we move forward.

We can meet the range of mine warfare force needs. We can provide increasingly robust organic capability for battle groups and amphibious ready groups. We can deploy many of our advanced technology needs. We can leverage intelligent acquisition practices, partnerships with industry and partnerships with our allies. But our thinking must be clearly focused and our commitment must be steady and sustained.

Thank you, sir.

[The prepared statement of Admiral Williams follows:]

PREPARED STATEMENT BY REAR ADMIRAL RICHARD D. WILLIAMS, III

INTRODUCTION

Rear Admiral Richard D. Williams, III, began his naval service in 1959 when he joined the U.S. Naval Reserve in Memphis, Tennessee. He received the U.S. Naval Reserve appointment to the U.S. Naval Academy where he studied Naval Science. He was awarded a Bachelor of Science Degree in 1964 and was commissioned an Ensign.

The 2 years following his commissioning, Rear Admiral Williams served aboard U.S.S. *Semmes* (DDG 18). He held the positions of Assistant Combat Information center Officer, Gunnery Officer, and First Lieutenant before going to the Republic of Vietnam where he reported to COASTAL SQUADRON ONE in November 1966. He was assigned as Officer in Charge of a Patrol Craft, Fast (PCF) and spent the following year conducting operation Market Time from Da Nang and Chu Lai, RVN.

In January 1968, he reported to Naval Station, San Juan, Puerto Rico, and served there as Security Officer until August when he was assigned to the staff of Commander, South Atlantic Force. He remained with USCOMSOLANT as Aide and Flag Secretary until 1970.

Rear Admiral Williams received a Master of Science Degree in Physics at the Naval Post Graduate School at Monterey, California, in 1972. In 1973, he attended the Navy Nuclear Propulsion School in Bainbridge, Maryland, and then the Nuclear Power Training Unit at Saratoga Springs, New York. In March 1974, he reported as Electrical Officer aboard U.S.S. *Long Beach* (CGN 9). Two years later he went to Idaho Falls, Idaho, where he served until February 1978 as Executive Officer of the Navy Nuclear Power Training Unit. In July 1978, he became Engineer Officer of the U.S.S. *Dwight D. Eisenhower* (CVN 69), a position he held until December 1981. In July 1982, Rear Admiral Williams relieved as Commanding Officer U.S.S. *Clark* (FFG 11). During his tour on U.S.S. *Clark*, he participated in operations off Lebanon and in the Persian Gulf.

He commanded U.S.S. *California* (CGN 36) from October 1985 until August 1988 and participated in U.S.S. *California*'s around-the-world deployment in 1987. He has served as Chief of Staff for the Surface Ship Directorate of the Naval Sea Systems Command Washington, DC, as Commander, Port Hueneme Division, Naval Surface Warfare Center, Port Hueneme, California, and as Director, Naval Warfare System Architecture and Engineering, Space and Naval Warfare Systems Command, Washington, DC. At present, he is the Program Executive Officer for Mine Warfare (PEO MINEWAR).

EXECUTIVE SUMMARY—PURPOSE

Summarize naval mine warfare acquisition achievements against a unified and prioritize list of goals; and review challenges for future.

DISCUSSION

Chief of Naval Operations promulgated mine warfare white paper that identifies mine warfare policy, focus and priorities. The specifics include:

Chief of Naval Operations/85 (Major General Jones)/Commander, Mine Warfare Command/CMWC (Rear Admiral Pearson)/Program Executive Officer, Mine Warfare (Rear Admiral Williams) have forwarded near-term (fiscal years 1996–1997) and mid-term (fiscal years 1998–2003) Campaign Plan to Chief of Naval Operations for approval that responds to his policy direction. The near-term plan is approved. A far-term plan is being drafted that covers the years after fiscal year 2003 and focus on the science and technology required to get us there.

PEO Mine Warfare testimony describes the organization's charter, reviews recent organizational changes that address life-cycle support responsibilities, demonstrates strong connectivity with the Sailors and Marines at the waterfront, and measures taken to increase ship readiness.

I am Rear Admiral Richard D. Williams, III. I am the Program Executive Officer for Mine Warfare. My prepared statement is offered for the record. In October 1992, the Program Executive Office for Mine Warfare was established to focus mine warfare acquisition responsibility and to allocate all mine warfare program efforts under a single manager reporting directly to the Assistant Secretary of the Navy for Research, Development and Acquisition, (ASN(RD&A)). The Program Executive Officer for Mine Warfare is the only United States Navy Flag Officer assignment in Washington whose sole responsibility is mine warfare.

There are two basic elements of this job. First, I have acquisition responsibility, including total life-cycle management responsibility, for mine countermeasures equipment used on both air and surface platforms, for offensive mine programs, for Explosive Ordnance Disposal (EOD) programs, and for selected Naval Special Warfare Very Shallow Water programs. In February of this year (1996), my responsibilities were expanded to include the two classes of mine warfare ships; the *Avenger* class of mine countermeasures ships (MCM–1 Class) and the *Osprey* class of coastal minehunter ships (MHC–51 Class). In essence, when requirements, priorities and budgets are defined, I oversee development, testing, and purchasing of the systems the operator needs.

Second, in matters pertaining to in-service support of mine warfare forces, I now report to the Chief of Naval Operations through the Commander, Naval Sea Systems Command. In this capacity, I structure and oversee the technical and support systems necessary to sustain these systems at the logistic required capability for as long as they are needed. My responsibilities for inservice support will expand further to include the Mine Countermeasures Support ship, U.S.S. *Inchon* (MCS–12), when she completes conversion and—returns to the fleet later this year.

I want to thank the committee for this opportunity to testify concerning the State of Mine Warfare. I believe the State of Mine Warfare is good and will continue to improve as long as a mine warfare focus is sustained.

ACQUISITION ACTIVITIES

I will first address the acquisition activities which have occurred since Operation Desert Storm.

MCM, MHC, and MCS Class Ships

All 14 *Avenger* Class MCM ships have been delivered to the Fleet. Two of these ships have been forward deployed to Japan; with two others currently enroute to the Persian Gulf.

Delivery of the new *Osprey* Class of coastal mine hunter ships has begun. We have delivered the first six of twelve MHC–51 class coastal minehunting ships. In the fall of 1995, we completed a successful series of shock tests on U.S.S. *Osprey* (MHC–51) at the Aberdeen Proving Grounds, Maryland. We used a test facility previously constructed for another program which provided near laboratory conditions, saved money, and met all environmental requirements. The lessons learned from these tests will lead to modifications for all ships of the class to improve shock hardening.

MCS–12, U.S.S. *Inchon*, will complete her conversion at Ingalls Shipbuilding from an amphibious assault ship to a mine countermeasures support ship this year. U.S.S. *Inchon* will carry four Explosive Ordnance Disposal detachments, eight MH–53E Sea Dragon helicopters, three H–46 helicopters, and an Airborne MCM Squadron detachment. In addition, the ship will have intermediate level repair capabilities to support the mine warfare ships and aviation units, storage of organizational and intermediate level spare parts and tools, and new command and control capabilities for the MCM Commander.

Shipboard Mine Countermeasures Combat Systems

A **Remote Mine Hunting System** is under development to fulfill an urgent requirement to provide a mine reconnaissance capability to the Fleet. The remote mine hunting operational prototype was developed during fiscal year 1994 and successfully demonstrated during Fleet exercise Kernel Blitz in fiscal year 1995.

The **AN/SSQ–94 Onboard Combat System Trainer** is being developed to provide an interactive onboard training capability for our mine-hunting sonar, mine neutralization, and ship command and control equipments. This system will allow our ships' crews to conduct realistic training while dockside and during steaming periods at sea. A prototype has been installed onboard MCM–2 (U.S.S. *Defender*) for final testing. A plan and funding are in place to install this capability on all the ships.

We are currently upgrading and standardizing the AN/SSN–2 Precise Navigation System to provide integrated ship command and control for MCM class ships. This will give us our first consolidated display of tactical information in these ships' Combat Information Centers.

The contract is being executed to buy the last remaining AN/SQQ–32 Minehunting Sonars for installation on all MCM and MHC class ships to replace the outdated AN/SQQ–30 sonar technology. The AN/SQQ–32 provides significantly improved mine detection ranges and depths.

Our forward deployed ships have received the digital connectivity to the Joint Maritime Command Information System (JMCIS) and are benefiting from onboard command, control and mission planning software. This capability will be provided to all MCM and MHC ships over a 3-year period.

Airborne Mine Countermeasures Systems

A variable depth mechanical sweep, the AIN37U–1, is currently in low-rate initial production. This will give the fleet its first capability to sweep deep moored mines not susceptible to current influence sweep methods . . .

The Performance Support System provides maintenance crews with online access to documentation critical to the successful maintenance of the A/N37U–1. It also incorporates a computer-assisted replacement ordering process and significantly reduces training costs.

The Airborne Stream and Recovery Modules (ASRM's) have been delivered to the fleet. This full-fidelity trainer replicates the physical space and characteristics of the back half of the MH–53E helicopter and enables flight crews to practice stream and recovery operations without the expense of flight operations.

Our towed hydrofoil sled, the MK 105, was highlighted in the Desert Storm Lessons Learned as in dire need of an upgrade due to maintenance and reliability issues. This sled provides magnetic and acoustic sweep capabilities for our MH–53E helicopters. However, the engine was rapidly becoming unsupportable and had to be replaced with a newer, more common type of engine. The first MK 105 Upgrade is on contract to be delivered in fiscal year 1998.

The AQS–14 minehunting sonar has been enhanced by Post Mission Analysis equipment which includes a Computer-Aided Detection and Classification capability. An operator trainer for the AQS–14 was developed and recently delivered.

We have continued development of Kaman Aerospace's Magic Lantern, Laser Optic mine detection system to significantly improve its performance and will deliver a contingency capability in early fiscal year 1997. A modification of this system demonstrated the capability to detect minefields in the Very Shallow Water (less than 10 feet) and surf zone.

Shallow Water MCM Systems

Desert Storm demonstrated the need for a deliberate in-stride, surf-zone mine field breaching capability. Our improved line charge, Shallow Water Assault Breaching System (SABRE), has recently demonstrated the ability to deploy inert versions from a manned Landing Craft, Air Cushion (LCAC) into a surf zone and will provide a significant near-term improvement in our capability to conduct amphibious assaults across beaches defended by minefields.

In 1992, we constructed a test facility at Eglin Air Force Base that allows us to duplicate surf zone gradients and water depths. This facility has been used extensively in the development and validation of the Distributed Explosive Technology and the Shallow Water Assault Breaching Systems as there is no environmentally approved surf zone site for live explosive testing.

We are in procurement for a Breach Lane Navigation System for guiding surface craft through the narrow lanes breached through the surf zone minefields and obstacles.

EOD MCM

I am supporting the rapid acquisition of prototype equipment to support the Very Shallow Water MCM Unit comprised of EOD divers, Naval Special Warfare personnel, and Marines to conduct shallow water MCM operations including clandestine reconnaissance.

We continue to deploy and support our unique marine mammal systems. These systems give us a neutralization capability against moored and bottom mines, as well as our only operational capability to detect buried mines.

Current Mine Programs

An improved Target Detecting Device (TDD) has been designed, developed, tested, and approved for production. This system has been developed for use in all bottom mines. It is programmable, with seismic, magnetic and pressure sensors, to better respond to increasingly sophisticated and more diverse third-world mine targets. The device is ready for production when funds and requirements priorities dictate.

U.S. offensive and defensive mining readiness has been allowed to degrade gradually since the breakup of the Soviet Union. Concurrently, however, U.S. mining requirements have decreased dramatically resulting in a net increase in overall material readiness (mine inventory compared to requirements). No new programs have been initiated, although modernization of the Submarine Launched Mobile Mine is being considered. We are monitoring the situation and continue to work closely with the Chief of Naval Operations staff to sustain a viable US mining capability and insure the stockpile is not overtaken by obsolescence.

LIFE CYCLE SUPPORT ACTIVITIES

As stated previously, my second major tasking is to sustain our ships and systems throughout their service life. I have worked closely with Commander, Mine Warfare Command to support his operational initiatives by focusing on readiness and sustainability concerns. I have approached this tasking in several ways.

First, I put in place a robust system for tracking fleet problems, analyzing root causes of problems, and prioritizing problem resolution.

Second, in conjunction with Commander, Mine Warfare Command, I conduct Homeport Conferences focused on providing officers and enlisted operators direct dialogue and input into the technical and logistics support establishments.

Thirdly, I established a cadre of Government and contractor technical and logistics support personnel at the waterfront in Ingleside, Texas, to enhance day-to-day communications and to be a waterfront resource to the fleet maintenance organizations.

All of our waterfront support activities are coordinated closely with fleet staffs to ensure no duplication of effort and to ensure that the most cost-effective organization evolves.

The Fleet responded with the formation of a Flag Level Oversight Council consisting of the senior leadership of all of the organizations with a stake in or responsibility for mine warfare. Many of the actions directed by the Council fell to organizations which are now a part of the Program Executive Office.

Hull, Mechanical, And Electrical Issues

The major problem with the ship's hull, mechanical and electrical systems was the reliability and supportability of the non-magnetic main engines produced in Italy by Isotta-Fraschini. The Isotta-Fraschini engines were failing too often, and we had a critical problem with non-availability of spare parts. We conducted a complete review and upgrade of the technical documentation used by the ships—and by the shore-based repair facilities. The revised technical documentation more completely identifies parts and the level at which repairs should be attempted.

In addition, we found second sources of supply for approximately 90 percent of the parts with which we had been experiencing problems. This not only enable the ships to get their engines back on line much faster, but the parts can be obtained less expensively. We brought the average supply delay time for the main engine parts down from 512 to 240 hours.

We have installed and planned changes to critical engine parts to improve reliability, maintainability, and supportability. The operational availability of the main engines has increased from a low of 56 percent in July 1993, to 72 percent in December 1995 (the most current data). This is comparable to other ship classes (e.g., the LSD 41 Class has an operational availability for main engines of 79 percent). The mean time between failure has increased from 280 hours to 350 hours over the same time period.

Infrastructure Issues

The depot repair facility has been successfully moved from Long Beach Naval Shipyard to the Shore Intermediate Maintenance facility in Ingleside, Texas. This initiative collocates the repair effort with the ships in a less costly facility. In place overhauls of the main engines, vice removing them for each overhaul, also promises to achieve substantial time and cost savings.

The mine warfare ships were among the few U.S. Navy ships which had not been provided with non-tactical automation for shipboard management of maintenance, administrative and supply functions. This, despite the fact that an MCM carries approximately 60 percent as many spares as a destroyer carries, and the MCM has only three people in the supply department vice a destroyer's eight people. All of the MCM's now have non-tactical automation on inexpensive personal computer local area networks, and the ships now have supply officers onboard. The MHC's will have these systems within the next year. This enables the mine warfare ships to much more effectively manage supply and maintenance and to more efficiently make use of the shore infrastructure.

We have identified those jobs which are more effectively performed on the waterfront, and we have moved a small core of people to Ingleside, Texas, under the leadership of a senior logistician. This saves travel money and puts the Navy's In-Service Engineers and Program Managers in direct touch with the Fleet on a day-today basis, ensuring that our priorities are in line with those of the ship operators. In-service engineering functions have been consolidated to ensure that limited funds are used to buy the best talent available to continue to improve the reliability and lower the life cycle support costs of our systems.

Ship Combat Systems Issues

The combat systems in use on the mine warfare ships today are sophisticated, complex electronic systems of 1970's and early 1980's vintage. The systems effectively perform their missions but are experiencing more costly problems with obsolescence of electronic components as well as reliability problems. Also, the technical documentation (training materials, technical manuals, drawings, allowance documents) developed and purchased with the ships were inadequate. The increased operational tempo of the ships, the more lengthy missions and forward deployments have created the need for greatly increased self sufficiency on the part of the Fleet.

A lack of standardization and rigid configuration management and a lack of available funds to retrofit updated systems on earlier ships resulted in multiple configurations of complex systems. Each version needed a costly, unique logistics infrastructure ashore. The results of these circumstances was a lack of the full range of spare parts in the supply system. As of 1995, over half of the requisitions for AN/SQQ–32 sonar parts were for items not cataloged in the DOD supply system. We have fixed that problem with newly issued allowance documentation identifying all required parts. The parts are being procured as funds are identified. The technical manuals have been revised to include enhanced fault localization data. All shipboard manuals are now available in digital format.

We are developing interactive electronic technical manuals for high-maintenance systems including the main engine, the minehunting sonar, and the mine neutralization system. These manuals will be available to the ships next year and will reduce mean time to repair systems. Previous Navy experience with interactive technical manuals used in classrooms has resulted in ten percent fewer maintenance errors and has shortened classroom time by 20 to 50 percent. The interactive manuals will also serve as interactive courseware making the data easier to use and much less costly to maintain.

We are in the process of standardizing the configuration of the installed combat systems. This process will take 2 more years to complete, and a greater period of time to have shore based battle spares and rotatable pool assets fully upgraded to the current Fleet configuration.

We have instituted strict configuration control; we install nothing without appropriate support packages in-hand onboard ship. Reduced life cycle support costs drive our priorities.

In response to House Report 104–208, our Integrated Combat Weapons System (ICWS), Block 0, will replace the unique electronic consoles for each combat system with standard Navy computers. This effort will enable us to complete the near elimination of the mine warfare unique logistics infrastructure while we move to more reliable and effective systems. This move will eliminate 788 electronic modules. For many of these old modules, some of which cost over $50,000 each, we have no source of supply. In their place, we will install 53 new modules. This upgrade is a sound business decision which will reduce infrastructure costs, improve readiness, facilitate training for operations and maintenance, and provide an improved capability to the mine warfare forces. This is a cost avoidance which will enable us to sustain the mine warfare forces without an increase in support costs.

Block 1 of this upgrade is focused on affordability concerns and will rehost the remainder of the MCM and MHC combat subsystems (navigation and neutralization) on the same state-of-the-art, open architecture consoles. This total effort will reduce the number of types of onboard consoles from five to one, reduce the lowest repairable units by 75 percent, and reduce the required spares by 70 percent. We estimate a life cycle cost avoidance of approximately $400M for ICWS Blocks 0 and 1.

The Mine Warfare Commander will benefit from the full C^{4}I connectivity, improved coordination of mine warfare forces, and increased survivability due to reconfigurable consoles. The Battle Group Commander will benefit from real time mine threat assessments (more fully defining the battle space) and the capability to tactically focus mine warfare forces to allow higher speed of advance and increased war fighting capability.

Airborne Mine Countermeasures

In 1994, the Navy combined the two active, two reserve, and one training squadron of MH–53E Sea Dragon helicopters into two integrated active/reserve squadrons. These two squadrons will both ultimately be located in Corpus Christi, Texas.

That move will allow further consolidation of training, shorebased maintenance, engineering and supply assets, thereby eliminating redundant infrastructure.

STANDARDIZATION

Both the airborne and the ship mine warfare forces have historically relied upon a shore-based logistics infrastructure unique to mine warfare. We have made it a major priority and have successfully moved to the use of the standard DOD logistic support databases, feedback mechanisms, maintenance and engineering facilities, and supply system. This is the only affordable option. Modernization plans, including Integrated Combat Weapon System, will significantly build upon this effort by eliminating high maintenance, low reliability hardware which exists in the mine warfare forces and replacing it with DOD and commercial standard systems.

The Program Executive Office has a major effort underway to analyze failure and maintenance data from both a cost and a readiness standpoint. Our priority for spending funds for even minor system upgrades is safety first followed by reliability and supportability improvements which drive down system life cycle support costs.

THE FUTURE

We have worked closely with CNO (N85) and Commander, Mine Warfare Command to reach the most realistic, achievable direction in which to proceed.

Near Term Campaign Plan

To support the CNO's near term campaign plan, we have undertaken the following efforts:

We will provide a Battle Space Profiler onboard MCM's and MHC's to provide valuable underwater environmental data. This data is critical to optimizing the AN/SQQ–32 Sonar settings for minehunting effectiveness and tactical mission planning.

The Deployment Contingency version of Magic Lantern will soon be fielded on the SH–2G Helicopters to provide an East Coast Squadron with an initial capability to quickly survey an area for the presence of moored contact mines.

A prototype Remote Minehunting System will be installed onboard U.S.S. *Cushing* for the fall 1996 U.S.S. *Kitty Hawk* deployment to provide the Battle Group with a mine reconnaissance capability. This will be an upgrade of the system successfully used in 1995 with the additional capability for shipboard launch and recovery and direct interface to the shipboard system.

The Campaign Plan identified gaps in connectivity between the Explosive Ordnance Disposal units, Airborne Mine Countermeasures units and the overall mine countermeasures commander. Working in close coordination with the Commander, Space and Naval Warfare Systems Command, we are examining the suitability of standard navy tactical data links to alleviate this problem. We are developing a working architecture to ensure all efforts in mine warfare are fully integrated and compatible with the Navy's Command, Control and Communications plans and policies.

Capability Gaps

To address mine warfare capability gaps, the following programs will be pursued:

The development and subsequent production of the AN/AQS–20 minehunting sonar will be continued to extend the airborne capability throughout the water volume and significantly increase its area coverage rate and depth capability.

The development of the Airborne Laser Mine Detection System will provide an organic capability on the SH–60 helicopter to detect and localize moored contact mines within the keel depth of surface combatants.

Working in conjunction with the AQS–14, AQS–20 and the ALMDS, the Airborne Mine Neutralization System will provide the capability to reacquire, identify, and neutralize both bottom and moored mines from the MH–53 and SH–60.

The ability to identify targets prior to deploying a neutralization device would have an even greater impact on time and cost. Mine identification is a capability gap that may be filled by development of an underwater electro-optical system. Identification is crucial to prevent expenditure of ordnance, fuel, and manpower trying to neutralize sonar contacts that closely resemble mines, but are actually clutter.

Modernization

A Science and Technology program, Explosive Neutralization, is in place to provide a mid-term, in-stride shallow water, surf zone and beach zone clearance capability to support rapid, maneuver from the sea operations. When incorporated into our surf zone explosive programs we will have the ability to conduct an assault breach from outside the surf zone in conditions up to sea state three.

Exploratory testing has been conducted to investigate the feasibility of night-time towing operations for AMCM. In addition, a simulation excursion has been executed to assess the impact of this desired capability.

Data Exchange Responsibilities and International Liaison Efforts

The United States Navy has an aggressive formal program with 14 friendly navies to share mine warfare information. I am the U.S. Navy's Technical Project Officer for these Mine Warfare Data Exchange Agreements. These fora cover a wide range of subjects depending on the mutual interest between the United States Navy and each individual Navy. These exchanges provide visibility into each others' mine warfare efforts. They provide a means to identify and convey research and development data or other data of mutual interest. They identify parallel interest for joint data collection with shared cost.

When requirements, funding and time frames coincide, these agreements can lead to mutually supportive or joint programs.

CONCLUSION

I see mine warfare as a great opportunity. While sea mines and the environment in which they are found provide significant challenges, many needs are straightforward and within current technology horizons. The Mine Warfare Center of Excellence in Ingleside, Texas, offers great opportunity to structure the "Right-Sized" and "Right Type" support organizations to best support the best mine warfare forces in the world. The single focus of Ingleside on mine warfare provides an opportunity for non-parochial, non-stovepiped, "out-of-the-box" thinking to do smart things as we move forward.

We can meet the range of mine warfare force needs. We can provide increasingly robust organic capability for our battle group and amphibious ready groups. We can develop many of our advanced technology needs. We can leverage intelligent acquisition practices, partnerships with industry and partnerships with our allies.

But, our thinking must be clearly focused and our commitment must be steady and sustained.

Senator COHEN. Thank you very much, Admiral.

If I could ask the panel, do all of you agree that both from the short-term, mid-term, and long-term programs are adequately funded; that there is no need for additional funding in any of the three categories that General Jones mentioned in his opening statement?

General JONES. Senator, as you know, the Secretary of Defense is required to certify each year to the Congress that there is adequate funding to support that particular program.

Senator COHEN. Well, we know there have been certifications year after year. We also know that there have been inadequate mine countermeasures capabilities. Certification has been pretty standard. The capabilities have been less than standard.

General JONES. With regard to fiscal year 1997, the certification has been signed off on yesterday by the Secretary of the Navy and is on its way to the Secretary of Defense. We—speaking for myself, I believe that the funds for this year, for fiscal year 1997, do support our goals and we are adequately funded.

Senator COHEN. At all levels, near-term, mid-term, long-term?

General JONES. Well, fiscal year 1997 addresses specifically the near-term portion of the plan, and frankly that was the benchmark by which—if this did not hold this year, the mid-term and long-term plan would not be workable, either. So the first piece of the plan is in place. We are this year going to make a transition from the dedicated to the organic force and put things in the fleet that the sailors can use. In that context, although it is a modest beginning, it is funded and it is adequate.

Senator COHEN. One of the problems that I have, and perhaps others on this subcommittee, is that year after year the Navy pays lip service to the need to upgrade its mine countermeasures capability and fire support capabilities, and year after year we do not seem to have the planning or the programming or the funding.

To give you some indication, for example, Senator McCain has asked the Secretary of Defense, and Admiral Boorda in particular to list those priorities that each would have if additional funding were made available. Out of the $3 billion that was suggested for add-ons, there was not a single item for mine countermeasures.

Does that give you any idea about the priorities as far as the CNO or the Secretary of Defense are concerned?

General JONES. I understand your point, sir. I think one of the things, one of the points we would like to get across this morning, is that mine warfare has transitioned in the last 3 years from, as was referenced earlier by Admiral Pearson, a Cold War, port breakout, essentially reserve-operated community, and is transitioning or trying to find its rightful place as a war-fighting specialty in the active fleet.

To do that with the creation of the Expeditionary Warfare Division, to do that we have had to essentially reorganize and rearrange everything that comes under that, the totality of mine warfare. It has not been easy. It is now, I think, to the point where we can say with some degree of confidence that the resources do support the plan, at least in the near-term.

We have identified the shortfalls and the gaps and we have a direction that we as a community agree on. This is a consensus-based plan. As I mentioned in my opening statement, we reached out to all levels in all areas that can spend money in the name of mine warfare. They used to be able to do so independently.

I would admit freely that there was never a degree of cohesion and there was never a degree of consensus that there is now. We hope that that continues, and if that does continue I think we will be able to come to you year after year and tell you that we are making progress and working with the staff showing you how we are going to do this.

Senator COHEN. Do you have direct sponsorship over all the resources associated with mine warfare and mine countermeasures?

General JONES. I have essentially—now, let me answer the question by saying there is approximately on average a little bit over one percent of the Navy's TOA is spent on mine warfare. Of that, of those resources, N85 controls about 62 percent of those resources.

Senator COHEN. 62 percent of 1 percent?

General JONES. Yes, sir.

Senator COHEN. Now, what was the figure you used before? That was 3.4 percent of the total?

General JONES. That is all of N85. Specifically, your question pertained to mine warfare. About one percent of the Navy TOA goes to mine warfare on average since Desert Storm. It had a peak after Desert Storm, going up to about 1.8, 1.7, and it has generally averaged out at 1.1 percent.

Senator COHEN. It's 1 percent. You have 60 percent control. Who has the other 40 percent?

General JONES. Well, the other, the other goes into, for instance, the submarine community has control of some of the money;

science and technology, naval research and the like. What has changed, though, is that within our community we act in concert and, because the campaign plan has been signed up to by all hands, it has been endorsed by the CNO and the Commandant, the CNO's white paper laid his blueprint for the future, we have much more cohesion and a much more focused sense of direction.

Senator COHEN. We received a GAO report this month that indicated that there are many different systems that contributed to the overall task of mine countermeasures, as many as 18 different development projects according to GAO's account. The report asserted the Navy's current approach in developing these projects has been inefficient, competing projects lack clear priorities, disruptive starts and stops in the projects, procurement at inefficient rates, too many research and development rice bowls to be kept filled, and on and on in this fashion.

Similarly, the annual mine warfare plans presented to the committee have reflected a lot of shifts in priorities over the years. We have one set of priorities 1 year, an additional set of priorities the next year.

Do you agree with GAO's assessment?

General JONES. I think historically there is some truth to that.

Senator COHEN. What has changed?

General JONES. What has changed is I think there is a new cohesion and a new recognition from the very senior leadership down through the community that we need to do better than we have done. We are developing really truly an expeditionary mine warfare capability, which is different than what it was prior to Desert Storm—a recognition that we cannot allow mines to deter us from our goals and objectives in operating on the littorals, we simply cannot do that.

The technology is there. It is a question of a community coming together and operating for the good interests and the best interests of the naval expeditionary forces. What has changed, I think, is that as a result of a concept-based requirements system, which is what campaign planning is all about, we are reducing the numbers of redundancies that were out there, that were essentially operating almost independently, and we are tasking anyone who can spend money in the name of mine warfare to seek the concurrence and agreement of the community before those dollars are expended.

The three of us here at this table have spent a lot of time together in these last 8 or 9 months at various off sites and we have brought in all of the other elements, including the fleet operators, to sit at the table and channelize these energies and these resources in a more productive way.

I am optimistic that if we continue in the direction that we are going the next GAO report will report considerable progress in those areas, because those redundancies will be eliminated.

Senator COHEN. Well, you indicated that the TOA is about 3.4 percent of the total obligational authority for mine countermeasures.

General JONES. For N85—I am sorry, 1 percent for mine countermeasures.

Senator COHEN. For N85. How does that relate to prior to Desert Storm in terms of percentages?

General JONES. Well, N85 did not exist prior to that. Is the question pertaining to mine warfare? Well, mine warfare since Desert Storm has increased in terms of its percentage of TOA. As I say, we had a little spike afterwards and it sustained itself, and then we went down. But it has leveled out at about 1.1, 1.2 percent of the overall TOA.

Senator COHEN. Admiral Pearson or Admiral Williams, using Desert Storm a benchmark, where today as compared to that period of time?

Admiral WILLIAMS. I think if you look at—again, one of the reasons for the PEO was to bring a group of disparate program offices, which had been in some cases even in different system commands, all in one place to try and focus them and get a sense of the program. I think we have gotten some synergies out of that that have been very useful.

But I also think we have learned a lot along the way, and that is what you see reflected in some of the change. Right after Desert Storm there was a three-star committee got together that was basically the driving force behind the first mine warfare plan, and they got very involved at very detailed levels of the kinds of things that we should look at as we changed the concept from a home port-based in the U.S. mine warfare force to a forward presence offensive mine warfare force involved with battle groups.

So I think as we have looked at the various things that people postulated that we would need, as we have done research and development, as we have conducted studies, we have determined that there were some things that were higher payoff than others, and I think that is the further effort that we went and took on during the campaign planning negotiations and discussions, was because we were trying to identify those that had the higher payoff, because clearly we had to set priorities to make sure that we were dedicated to things that we could produce.

In fact, one of the things that was very encouraging is that as we looked at this near-term, clearly we did not have the authority to completely jerk money around from various programs, and we were very careful to try to make sure that we did not break anything unless it was a very low priority thing that we ought to not be doing anyway.

So I think we have had some progress. We have learned a lot. We have developed a lot of synergy out of all of this, and I think we are beginning to have a very clear focus on the kinds of things we like.

Clearly, reconnaissance has been a continuing need that we have had and postulated.

Senator COHEN. We have cut back on the airborne reconnaissance, have we not?

Admiral WILLIAMS. Say again, sir?

Senator COHEN. Have we cut back on the airborne reconnaissance?

Admiral WILLIAMS. As part of the consolidations we have consolidated the aircraft squadrons, but they are more active mine warfare forces. The reconnaissance I'm talking about is the reconnaissance to find out where mines are or where they may be or where they aren't, to provide that information to a battle group commander. That has clearly been one of those things that we recognized would be a very useful took, and it supports the Marine Corps' concepts of operational maneuver.

Senator **COHEN**. Are you drawing a distinction between minehunting and minesweeping?

Admiral **WILLIAMS**. Yes, sir.

Senator **COHEN**. Admiral Pearson?

Admiral **PEARSON**. Senator, if I can, when I look back at the pre-Desert Storm time frame, of course N85 did not exist then. To the best of my knowledge, of the mine warfare programs that would probably be analogous to the ones that are under the sponsorship of N85 today, I would estimate we were somewhere around .5 percent of the Navy TOA. As General Jones has indicated, he now has sponsorship for about .62 percent.

So there has been a slight increase if you compare 5 years or so ago with the present time.

Let me add some what I consider from my point of view amplifying comments relative to the GAO report that you referred to. It is true there have been some stops and starts in our research and development and acquisition programs. They are attributable to a number of factors, I think. For instance, if you look at the spike in funding that we saw immediately after Desert Storm, we embarked on a relatively large number of research and development and acquisition programs, and then as budgets across the Department of Defense began decreasing we found that we had to cut some of those. A few were underbid to begin with and we had to make up funding for those.

So I do not think that the stops and starts that you saw necessarily were unreasonable, given that funding history. I would add, though, that we were also still evolving our tactics, techniques, and procedures for how best to use our force. As we learned more about what was most effective in conjunction with the decreasing funding, we cut some programs and settled in on the ones that I think were probably likely to be the most productive force as we best knew the mine warfare business.

But I would also like to add, we have realized a lot of return on the investments that we made. We have a capability for utilizing remote sensors for recon of beaches and surf zones. We have got the remote minehunting system that we referred to a few minutes ago. In the submarine community we have got a near-term mine reconnaissance system and a long-term mine reconnaissance system that is progressing down the research and development and acquisition track.

We have got a Magic Lantern deployment contingency which will give us a laser imaging capability in the fleet in the near term, that is probably within the next year. We have got breaching systems for the surf zone, including explosive technology, SABRE, DET, distributive explosive technology, to blast mines out of the way through the surf zone. We have got a C^4I architecture being injected into the mine warfare force that puts us up with state of the art with battle groups and amphibious sources.

We have got a new airborne sonar coming down the pike that will be here probably by year 2001, the AQS–20, which will double the range and depth of our search capability from our helicopters.

We have got an environmental data system that now provides us with a look at the environment we have not had before, and that will continue to expand into tactical decisions based on environmental conditions and also give us a very good measuring capability in situ.

The SQQ–32 sonar for our ships is, we are only about six ships away from complete installation of that. As Admiral Williams mentioned, we have got an extremely sophisticated modeling and simulation capability now that we did not have before. We are installing an embedded training system on our ships so that they can train in port or under way for individual watch standers or watch standing teams.

So there has been a lot of capability realized, although I grant you we have had some cancellations in programs. If you ask about whether I would like more money, yes, sir, I will always say I would like more money. I think what that would do would enable us to speed up the realization of the plan that we put together. We could do some things that presently are scheduled in out years, move them up several years possibly.

Senator COHEN. Thank you very much, Admiral.

Senator Kennedy.

Senator KENNEDY. Thank you very much.

I believe that the funding levels in and of themselves do not provide all the answers to all the questions that were provided for, but they do indicate a priority by the Navy, in this case in terms of the mine warfare function. I think that is at least an interest of the committee, to find out whether the kinds of reductions and cuts on mine warfare, when we get the final figures, are going to represent sort of the standard cut across the board or whether it is being looked at as an important and special function, which there has not been given the focus and attention on. That is what we are going to be certainly, what I am going to be looking at.

You cannot indicate to us when we will have the information, it will be available, in terms of what the funding levels are going to be, can you? Can you tell us when we are going to get that, General Jones?

General JONES. For what year, sir?

Senator KENNEDY. This year.

General JONES. I am not sure where that is in terms of the system.

Senator KENNEDY. Well, can you tell us whether the warfare programs have been subject to a greater, smaller, or proportional share of the cuts in the Navy investment program?

General JONES. I would say that they are proportional, sir.

Senator KENNEDY. Well, the reason that this is being pressed is because we hear now that we have got greater coordination, greater consolidation, greater function, and these were all programs that were resisted by the United States Navy. They resisted the efforts of Senator Cohen, myself and others to develop this kind of capability.

The funding levels, you go back for several years, the kinds of programs were actually included in there by this committee with the resistance of the Navy. So we are glad to hear that we are getting better coordination, better consolidation, and more kinds of research.

I hope you will provide for us the details of the figures of how you get up to the $1.4 billion. In 1992 the research and development for mine warfare was somewhere around $30 million. We added $40 million to it. That is why it is interesting. We say, well we got a little bump during that period of time and now we have accepted some of the research that seems to be worthwhile and discarded some of the others.

That was put in there by the Congress and that is what we are trying to find out, whether we are pulling teeth again now or whether we have got a DOD that is fully committed to it. We are trying to drive on that particular.

I would be interested if you could submit for the record how you get up to the one percent. I am just amazed. Maybe it was just the overall mine warfare. I would be very interested in what we are getting in terms of the research and development and how that has flown since the period of time.

[The information follows:]

MINE WARFARE

Senator KENNEDY. I would be interested if you could submit for the record about how you get up to the one percent.

General JONES. Table 1 below provides the Department of the Navy (DoN) total obligation authority (TOA) from 1987 through 2003 as compared to the TOA allocated for mine warfare. From 1987 through 1991 mine warfare received an average of 0.8 percent of the DoN's TOA. The average percent of the DoN's TOA for mine warfare from 1992 through 2003 is 1.3. The mine warfare TOA includes funding from all resource sponsors who have programs associated with none warfare, not just programs and funds controlled by N85. Table 2, attached below, provides a break-out of how the mine warfare funds are distributed by resource sponsor. As one can see, N85 is the sponsor for only 62 percent of the funding expended on mine warfare in the DoN. An explanation of the acronyms used on the tables follows:

RS—Resource Sponsor
N85—OPNAV Expeditionary Warfare requirements
N6—OPNAV Space and Electronic Warfare requirements
N86—OPNAV Surface Warfare requirements
MC—Marine Corps requirements
N88—OPNAV Air Warfare requirements
N87—OPNAV Submarine Warfare requirements
N091—Naval Test & Evaluation, and Technology requirements
N096—Oceanographer of the Navy requirements

TABLE 1

HISTORICAL MINE WARFARE (MIW) TOTAL OBLIGATION AUTHORITY (TOA)

[all Resource Sponsors]

Fiscal year	MIW Amount (TY&M)	DoN Amount (TY&M)	DoN TOA for MIW (Percent)
Fiscal year 1987–91 is RAD V Database October 1991			
87	463	85970	0.54
88	522	93029	0.56
89	708	88652	0.80
90	1090	91675	1.19
91	740	82773	0.89
Fiscal year 1992–2003 is RAD IX Database March 1996			
92	962	82286	1.55
93	1082	78328	1.85

HISTORICAL MINE WARFARE (MIW) TOTAL OBLIGATION AUTHORITY (TOA)—Continued

[all Resource Sponsors]

Fiscal year	MIW Amount (TY&M)	DoN Amount (TY&M)	DoN TOA for MIW (Percent)
94	779	77512	1.19
95	636	80418	0.95
96	757	79252	1.17
97	846	75645	1.36
98	788	78488	1.18
99	907	80637	1.34
00	914	82905	1.24
01	965	84434	1.27
02	935	86475	1.27
03	916	88565	1.18

TABLE 2

MINE WARFARE (MIW) TOTAL OBLIGATION AUTHORITY (TOA)

[by Resource Sponsor (RS)]

RS	Total (fiscal year 1996–2003, $M) (RAD IX, Then-year)	Total (percent)	Type
N85	4350	62.0	Dedicated MIW
N6	28	0.4	C^4I
N86	42	0.6	SCN for SMCM
MC	155	2.2	Marine Corps
N88	620	8.8	AMCM support
N87	642	9.1	SSN & ADS MCM
N091/96	1191	16.9	S&T Support
Total MIW	7027	100.0	

This is not really a new issue. As we all understand, the U.S. Navy did not have the prime responsibilities when we had the Cold War. It was left more to NATO. I remember going over in 1987 into the Gulf and seeing those helicopters dragging those cables after the frigate had been hit, escorting various Kuwaiti tankers down through there, and talking to the servicemen about that kind of capability and the inefficiency and the drag that it was providing at that time.

Then we did not see anything any better coming back in the Gulf War, and we did not have any urgency in terms of the requests from the Navy for this particular function. So we are trying to find out now when we get this recommendation whether this is business as usual and whether this function is going to get the priority that it has lacked previously.

That is against the background, which Senator Cohen has pointed out. Senator McCain asked, where you would spend additional funding in terms of the Navy, not for the $2 billion but the $3 billion, and mine warfare is not even listed. You cannot tell us when we will get it. You tell us it is getting proportional cuts.

It is interesting that we are doing better than other countries in terms of NATO on this function, but I am not greatly assured. It is pretty self-evident, I think, to all Americans that these are the weapons of choice in many of these countries. These mines are cheap, they are pretty effective. They do not need a lot of sophistication. They do not have to sink a ship; they can just interfere with the freedom of the seas. They really present a very important and significant impediment in terms of the ability to try and carry through in these littoral situations.

So that is what we, at least I, was interested in.

I was interested, Admiral Pearson, in you reviewing the newer technologies. Could you elaborate some on some of the breakthroughs have been or what you see now in terms of the newer types of technologies that you believe give you greater capability, mostly in these littoral situations? I mean, we understand the difference in the analog sonars and the digital. That is a breakthrough in terms of technology generally and they are going to have better sonars down the line in terms of the Navy. It is going to have greater capability.

I am also interested in technologies that are coming on line, that they are going to be of help and assistance to the Navy and Marines in terms of the shallow waters and the littoral kinds of situations.

Which ones have impressed you the most, and where do you think it is going in terms of the future possibilities?

Admiral **Pearson**. Yes, sir. I have to cover a number of years to respond to that question properly. Starting with your comments relative to air mine countermeasures back in the 1987–1988 time frame when we were dragging cables through the water, now, dragging cables through the water is still a viable process for clearing mines that are what we call moored mines, that are buoyant and anchored on the bottom and rise to just beneath the surface.

There are latter day versions of those that are deeper that we have had to contend with. One system that is new to deal with that is the AN–37 Uniform, which is a new mechanical sweeping system that now allows us to get down to about [deleted] foot water depths. So that capability you saw in 1987, 1988 will go from about [deleted] feet capability down to about [deleted] foot capability.

You have already mentioned our sonar technology, and it is the digitized variety of sonar that also has better signal processing capabilities, and that allows us to get about twice the range to either side of the aircraft and about twice the depth. Those systems are specifically designed to upgrade our deep and shallow water capabilities to allow us to get the more modern day mines that were moored deeper and had more sophisticated firing circuits.

We also are upgrading the magnetic influence sweeping capability. We are overhauling the sleds and putting a new generator that will have more pulsing power and more endurance.

On a broader scale, moving into the water regimes that you referred to at the tail end of your remarks, we have of course to deal with the very shallow water surf zone clearance in support of amphibious operations, that is from 40 foot water depths on into the high water mark. As Admiral Williams has already mentioned, we have the remote minehunting system which gives us an unmanned underwater vehicle that we expect to be able to deploy into water depths as low as about ? feet, so that we can follow up our remote sensor work and get a detailed mapping of a mine field in the amphibious objective area.

From that, we can determine where the exploitable gaps are, where the weak points in the mine field that we focus our effort to provide breach lanes for our amphibious assault vehicles.

We have put together a very shallow water mine countermeasures unit consisting of Navy EOD divers that have worked in mine countermeasures before, Navy special warfare divers, the SEAL's, and Marine Corps force recon divers. Additionally, we will also integrate our Navy dolphins into that effort. We have just formed that unit. They will initially find new techniques, tactics, and procedures to utilize existing assets and improve our capability in the very shallow water regime.

Out of that we expect we will find some technology challenges that remain. But we think that laser imaging techniques that are a fairly mature technology now will provide us some capability in that respect. We will probably also find utilization for the Navy SEAL diving systems and the delivery vehicles that would allow us to take divers in a very low observable mode, and also truck in a significant number of neutralization charges.

Finally, the breaching systems for going to the surf zone I had mentioned previously are the distributed explosive array capabilities that we will be able to project from an LCAC on the way in, so that we have an in-stride breaching capability to support the amphibious assault vehicles.

Senator KENNEDY. This is impressive. General Jones, if you could provide for us just about where we are in that research and development budget, what it has been in the past, and where that is going now.

Second—and my time is running out—do you make an assessment about where you are going to go in terms of the research and development capability of those out there that appear to be most antagonistic or potentially the most hostile to our interests? I mean, you do the assessment, or how does that figure in, when looking at the capability of Iran or Iraq in the Gulf areas or other countries and their capability? Do you try and bring greater focus in on this? I would be interested in that, and maybe you could comment briefly on that.

General JONES. A brief comment, yes, sir. But before I touch on that, just to give you a measure of some direction of where we are going in the near term, in order to fund the near-term portion of our campaign plan, which is 1996 and 1997, from internal to the Navy, we asked for and received $15 million in fiscal year 1996, $25 million in fiscal year 1997 plus-up from inside the Navy's accounts to make that plan hold together.

Additionally, we asked and received a $30 million plus up in program review 1997, that all went into readiness for COMMINE WARCOM's operation. So there are some indications that the plan is holding together and that the work that went into articulating the requirements is in fact supported by solid assets.

Senator KENNEDY. I wanted to just make sure—Senator Cohen was talking about what is going to mine warfare. I think it would be useful for us also to have it on the research and development, what that is, what the flow lines and what you expect to go on that.

General JONES. Yes, sir, we would be glad to provide that.

[The information referred to follows:]

The following spreadsheet contains the complete Department of the Navy (DON) mine warfare research and development funding profile. All amounts shown are "then year" and in thousands of dollars ($K). An explanation of the acronyms on the spreadsheet are as follows:

RS—Resource Sponsor

APPN—Appropriation

PE—Program Element

CLI—Claimant Line Item

N85—OPNAV Expeditionary Warfare requirements (Note that prior to fiscal year 1992 OP–03 (listed as "03") was the resource sponsor for mine warfare. OPNAV N85 (listed as "85") was created and assumed sponsorship for mine warfare in fiscal year 1992 and later.)

N87—OPNAV Submarine Warfare requirements

N091—Naval Test and Evaluation, and Technology requirements

N096—Oceanographer of the Navy requirements

MC—Marine Corps requirements

DON RDTE Funding Related to Mine Warfare
TY$K

RS	APPH	PE	PE	CLI	$1991	$1992	$1993	$1994	$1995	$1996	$1997	$1998	$1999	$2000	$2001		
85	RDTE	0204413N	(U) MCAC REMOTE CONTROL	82231	0	0	0	0	3444	4229	848	879	3215	7151	3588		
85	RDTE	0603709N	(U)ADVANCED MARINE BIOLOGICAL SYS	Q0214	0	4780	4490	0	0	0	0	0	0	0	0		
85	RDTEN	0603601N	CAPTOR IMPROVEMENT	S2024	3639	6558	0	0	0	0	0	0	0	0	0		
85	RDTEN	0604654N	(U)JT SERV EXPLOSIVE ORD DEV (ENG	Q1829	0	5660	5654	6178	6242	5240	7346	5205	6257	6256	6405		
85	RDTEN	0604601N	(U)MINE DEVELOPMENT (ENG)	Q0267	5368	2723	1807	2692	3161	2951	2505	2927	3688	3682	3762		
85	RDTEN	0604601N	(U)MINE DEVELOPMENT (ENG)	Q0272	6802	5949	6233	2883	0	0	0	0	0	0	0		
03	RDTE	0604373N	(U)AIRBORNE MINE COUNTERMEASURES	W2047	3919	0	0	0	0	0	0	0	0	0	0		
85	RDTEN	0604373N	(U)AIRBORNE MINE COUNTERMEASURES	Q0526	0	1403	1179	5447	1357	3300	1358	0	0	0	0		
85	RDTEN	0604373N	(U)AIRBORNE MINE COUNTERMEASURES	Q0529	0	13514	16462	16523	9165	12390	13164	13069	5694	0	0		
85	RDTEN	0604373N	(U)AIRBORNE MINE COUNTERMEASURES	Q2047	0	13837	12728	9189	8835	17689	0	0	0	0	0		
85	RDTEN	0603654N	(U)JT SERV EXPL ORD DISPOSAL DEVELOP	Q0377	4920	4968	6672	6247	6851	4654	2370	6109	6208	6208	6354		
85	RDTEN	0603654N	(U)JT SERV EXPL ORD DISPOSAL DEVELOP	Q1317	2726	3061	3219	2648	2511	2419	2269	2304	2669	2663	2723		
85	RDTEN	0603553N	(U)SURFACE ASW	80229	0	0	0	0	0	785	0	0	0	0	0		
03	RDTE	0603502N	(U)SURFACE & SHALLOW WATER MCM	81233	14372	0	0	0	0	0	0	0	0	0	0		
85	RDTEN	0603502N	(U)SURFACE & SHALLOW WATER MCM	Q0260	7271	9931	14826	17025	264	8966	26308	7000	11583	21982	19122		
85	RDTEN	0603502N	(U)SURFACE & SHALLOW WATER MCM	Q1233	0	10959	10162	9983	8835	6844	1726	1387	0	0	0		
85	RDTEN	0603502N	(U)SURFACE & SHALLOW WATER MCM	Q2131	0	8590	18767	13471	16770	18561	33001	39605	39654	22818	17389		
			TOTAL N86 MIW RDTE FUNDING		50017	81903	99418	82288	84456	88027	90992	77486	78968	70784	68341		
87	RDTE	0604503N	AN/BSY-1 HF UPGRADE/AMDS	80219	0	0	0	0	0	1000	4790	6277	5909	0	0		
87	RDTEN	0603502N	(U)SURFACE & SHALLOW WATER MCM	V2094	0	0	0	3988	17845	19998	25960	21446	24954	24078	23755		
87	RDTEN	0604784N	(U)DISTRIBUTED SURVEILLANCE SYSTEMS	X1300	0	0	0	20068	16568	28957	35194	34314	39087	41024	41965		
87	RDTE	0603502N	(U)SURFACE & SHALLOW WATER MCM	V2094	0	22837	0	0	0	0	0	0	0	0	0		
87	RDTE	0604784N	(U)DISTRIBUTED SURVEILLANCE SYSTEMS	X1300	0	0	13241	0	0	0	0	0	0	0	0		
			TOTAL N87 MIW RDTE FUNDING		0	22837	13241	24056	34411	49953	65944	62037	69950	65100	65740		
91	RDTE	0601153N	DEFENSE RESEARCH SCIENCES PROJECTS	00000		0	0	0	0	8000	10300	9600	9100	8600	5700		
91	RDTE	0602131N	(U) MC LANDING FORCES TECH	00000	16971	4463	4601	4743	4890	4282	5800	5900	6200	6300	6500		
91	RDTE	0602315N	(U)MINE COUNTERMEASURES MINING & TECH	00000	19721	21181	42000	23512	36932	46894	40534	42885	48988	49954	51040		
91	RDTE	0602435N	(U)OCEAN & ATMOSPHERIC TECH	00000	33085	4000	4000	4000	10000	16900	17900	18400	19000	19600	20100		
91	RDTE	0603555N	(U) SEA CONTROL & LITTORAL WARFARE	R2142	0	0	61055	67738	0	0	0	0	0	0	0		
91	RDTE	0603640M	(U)MARINE CORPS ADV TECH	C2078	2402	4159	300	5414	0	0	0	0	0	0	0		
91	RDTE	0603640M	(U)MARINE CORPS ADV TECH	C2079	00000	0	2564	5050	0	0	0	0	0	0	0		
91	RDTE	0603640M	(U)MARINE CORPS ADV TECH	C2223	0	0	0	0	6983	12783	7500	7700	7900	8200	8400		
91	RDTE	0603782N	(U) SHALLOW WATER MCM DEMOS	R2127	16578	4914	9762	0	0	0	0	0	0	0	0		
91	RDTE	0603782N	(U) SHALLOW WATER MCM DEMOS	R2226	0	0	0	11292	41890	39002	42753	41636	44784	49787	46701		
91	RDTE	0603747N	(U) UNDERSEA WARFARE TECH	X1933	0	0	0	30	105	12219	8886	11622	12034	13158	13770		
91	RDTE	0605856N	(U) STREATEGIC TECH SUPPORT	Z1038	0	0	0	0	15	545	814	824	910	896	884		
96	RDTE	0603785N	(U) MEDAL	R0120	0	0	500	500	500	1500	1000	500	500	500	500		
			Total N091/N096 MIW RDTE FUNDING		88756	38697	124612	112279	101325	134128	125287	129547	140296	148378	147895		
MC	RDTE	0604612M	(U) MAGNETIC MCM SYSTEM	C1969	3696	1155	2507	2213	1465	930	3032	6	0	0	0		
MC	RDTE	0603612M	(U) STAND-OFF MINEFIELD BREACHER	C2106	0	0	0	310	4540	1722	0	0	0	0	0		
MC	RDTE	0604612M	(U) STAND-OFF MINEFIELD BREACHER	C2106	0	0	3342	0	0	0	2710	3023	3333	5983	1810		
MC	RDTE	0206624M	(U) COMBAT MOBILITY VEHICLE	C0078	0	0	0	0	0	0	19	809	627	25	0		
MC	RDTE	0604612M	(U) ANTI-PERSONNEL OBS BREACHING SYSTEM	C1969	0	0	0	0	0	95	0	0	0	0	0		
			TOTAL MC MIW FUNDING		3696	1155	5849	2523	6005	2747	5761	3838	3960	6008	1810		
			GRAND TOTAL RDTE FUNDING		142468	154552	263321	231144	208196	374852	287985	272717	293154	290743	274784		

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Senator KENNEDY. Then also, if you could comment on how you evaluate the capability of some of these countries that are providing these resources to other nations, their capacity and capability, and whether we are focusing our research on those kinds of capacity.

General JONES. Yes, sir.

Senator KENNEDY. Then, Mr. Chairman, I will just submit questions on the support fire issue, since my time is up, and if I could get some responses on those as well.

Thank you. We want to work with you. We want to really be of help and assistance in this area, and we want to find out what you need. It is enormously important, I think. This committee has given it an important priority. We want to make your job easier, rather than more difficult. So I hope that we can find ways of working more closely.

General JONES. We are most grateful for that, Senator. Thank you.

Senator KENNEDY. Thank you.

Thank you, Mr. Chairman. Senator Cohen: Senator Lieberman.

STATEMENT OF SENATOR JOSEPH I. LIEBERMAN

Senator LIEBERMAN. Thank you, Mr. Chairman. I have really just one comment and one question.

First, to thank you and Senator Kennedy for the role that you have played in really driving home the importance of developing these mine countermeasures to secure coastal waters in the kind of conflict situations we have faced and are likely to face in the post-Cold War.

I had the opportunity to look at the article in this month's "Sea Power" magazine, and I think it should give encouragement to my colleagues who have been leaders on this, remarking on the fact that Admiral Boorda had authored a rare white paper which was issued last December, titled "Mine Countermeasures, an Integral Part of Our Strategy and Our Forces," and pointing out that the CNO had designated mine warfare as a front line Navy warfighting specialty, with the same status as surface, undersea, and air warfare.

So I think the message is getting over, and I appreciate both the leadership of my colleagues and the response of the Navy.

I just have one question, which is really sort of a home question out of curiosity. One of the smaller, less visible, feistier, more creative companies in Connecticut is Kaman. I know they have developed an airborne laser mine detection system called Magic Lantern. I am curious about, to the extent that you are able at this point, what the Navy's response to that system is. How is it doing? How is it being used? What is your hope for the future on it?

General JONES. Sir, I will just touch on it briefly in general terms and then I will defer to Admiral Williams. This program is a good indication of what we are talking about when we talk about campaign planning and bringing near-term capabilities into the hands of the fleet. It is prominently featured in our near-term campaign plan.

We have plans to buy three systems of the Magic Lantern and putting them on reserve helicopters. This is a technology that we critically need and we intend to not only do that, which sounds like a modest first step, but it does give you an organic capability which did not exist before. In the future we would like to go on and take that technology and transition it to the fleet helicopters, so that we have the resident on-board capability that the sailors and marines need when they go into harm's way and to be able to do something about it.

Let me ask Admiral Williams to comment more specifically.

Senator LIEBERMAN. Why do you not just, without going into enormous detail, describe the basic idea of the Magic Lantern system.

Admiral WILLIAMS. Yes, sir. Magic Lantern system is basically a range-gated laser system. Basically, the helicopter puts out a laser pulse and then it receives the return on each of six successive, six cameras, and it is timed so that it gets a slice of water with each return, each return from the sea. So that basically you have a picture of whatever exists at the 10-foot mark of the water, plus whatever is above it, because you will see the shadow of anything that is in that level above the 10-foot mark. Then you will get another one down at the 20-foot mark.

So by collating all of this data, you can actually get a pixel representation of the reflection you get from below the water, and clearly if you are looking for a mine that is two or three feet wide that will give you a fairly healthy return.

The concept behind Magic Lantern was to test this concept to see if you can make it work. In fact, about last year—and I think it was really a success story—just about this time we were really struggling with the problem. It was a coordinated team with Command Aerospace, with our Navy laboratory down in Panama City, Florida, as well as people from the program office, because we had a very high false alarm rate. In other words, you could see mines, but you also saw a lot of things that were not mines.

We had to come up with the right kind of algorithms to make that distinction or really we did not have a system that was operationally feasible. In other words, if it is going to see 35 contacts every time it goes out and only 2 of them are mines, it is hard to distinguish whether you really have a mine problem or not.

It was about a 4-month effort with the team between Command Aerospace and the laboratory and the program office, actually got that down to much lower than the specification required, which was—I think the spec was like five per square mile and we got it down to something like two and a half or three per square mile, which now makes it a very viable system.

That is why we have gone ahead with the deployment contingency of following the Congressional direction that we had on that, of building three of these, putting them on the SH–2 Golf, having them available in the Naval Reserve, to give us a capability basically next year.

Senator LIEBERMAN. Am I correct that one of the assets of this system is that it can sweep a large area fairly quickly? In other words, its rate of coverage of an area?

Admiral WILLIAMS. Yes, sir. The beam is focused as well as the camera, so that it does have a very large, large area coverage rate.

Senator COHEN. Would you distinguish minesweeping and minehunting for us?

Admiral WILLIAMS. "Sweep" in that respect is the sweep of the laser light going into the water, not sweeping and hunting. I think Admiral Pearson probably——

Admiral PEARSON. Let me address that one. Minesweeping basically is an operation where you are going in in the blind and doing one of two things: you are either dragging cables through the water to cut the moorings for moored mines, so that they float to the surface and then you neutralize them with divers; or else, for mines which respond to magnetic or acoustical pressure signature, you are attempting to emulate that signal and satisfy the firing logic of the mine itself.

The basic rule in mine countermeasures is hunt if you can, sweep if you must. Hunting is a much more measured, safer approach, because you are looking ahead with sonar or whatever sensor we develop in the future and you see the mine, and then you deploy a remotely operated vehicle or a diver to put a neutralization charge on the mine and destroy it.

In general, as I have said, sweeping is risky because you cannot see what is ahead. You are depending on your sweeping device to provide you with the protection, and statistically you are probably taking some of a risk. In general, it is a speedier process than hunting is because, as I said, it is a very slow, measured approach. You can cover more area by sweeping more rapidly than you can by hunting, if you accept the relative risk.

So if you are in a very time-constrained situation, you generally tend to mine sweep. Or there are a number of areas in the world where hunting is not very feasible because you have got a significant amount of clutter on the bottom—trash from years and years in channels, or you have got a very rocky bottom. In that case, then you dedicate sweeping assets to the problem and hunt in the areas that are more amenable to hunting.

Specifically in terms of the area coverage rate, though, associated with Magic Lantern, any time you mount a system to a helicopter you realize greater speed because of the helicopter's inherent speed advantage over ships. Of course, the helicopter's endurance is limited in terms of flight time. We are also night operations capable, so you do have the capability of doing those functions on a 24-hour basis with the ships.

So it depends on the operational situation. The only thing about sweeping is it is very intelligence-dependent. You need to have some idea of what types of mines you are up against, so that you can set your sweep devices accordingly.

Senator COHEN. Would Magic Lantern not be available to work at night?

Admiral PEARSON. No, sir, Magic Lantern is capable of operating at night. In this case, our helicopters are capable of operating at night. It is when we are towing sleds and devices that put the helo in a more tenuous flight regime at night that it becomes—it is not within our capability presently.

Magic Lantern, though, would be a night-deployable system, so you could operate at night in terms of searching an area and finding out where you have a higher or lower mine densities, and then during daylight you would apply your assets to clear those mines accordingly.

Senator LIEBERMAN. Thank you. Thanks, General. Thanks, Admiral.

Senator COHEN. Senator Robb.

STATEMENT OF SENATOR CHARLES S. ROBB

Senator ROBB. Thank you, Mr. Chairman. I regret I have got three security hearings going on at the same time and I did not get here for all of the opening testimony.

I did have occasion yesterday late afternoon to have a wide-ranging discussion with Admiral Boorda, and one of the things that we talked about was the arsenal ship and the role that it might play, and particularly as compared to battleships.

We really did not get into a cost comparison with battleships in terms of what it would cost both with respect to munitions delivered on target, the effectiveness of those munitions, and any refurbishing costs. That is an argument or a debate that I thought was pretty well behind us, but I am not sure if it is if we are trying to make some cost comparisons.

Anyone who has an observation with respect to this, I would appreciate it. Then, General Jones, I wanted to ask one question about the AAAV. I will hold off for a minute on that, with respect to its tie to the development of mine countermeasures.

General JONES. Sir, if I could just in general touch on the arsenal ship question and the naval surface fires. I think under Admiral Boorda and General Krulak this is a topic that is receiving a lot of attention in both Navy and Marine Corps channels. There are, with regard to naval surface fires, in the RDT and E accounts out to '03 probably upwards of half a billion dollars devoted to bringing that capability gap into some sort of—to remedy the gap, let us put it that way.

The projects with regard to the conversion of the 5-inch gun and developing the extended range guided munitions, the missile programs, and finally the arsenal ship, which admittedly is a concept right now, but a very good one that we are all excited about as to what it can do to remedy this, remedy the gap, is something that we are excited.

Senator ROBB. General, what do you see the arsenal ship specifically displacing in the current inventory? The concept makes a lot of sense in terms of the things that it might be able to do and the ability to bring a platform that has multiple purposes in the theater of operations. But I am curious——

General JONES. I do not think it displaces anything, Senator. What I think it does is I think it satisfies a gap in capabilities that, absent the older platforms like the battleships, will fuse together the existing technologies ranging from systems like the ATACMS all the way up to the Tomahawk, and also conceivably even a gun system that would fire at extended ranges and with very precise accuracy.

That is not there right now, and that is a very serious capabilities gap in terms of making "Operational Maneuver From the Sea" and "Forward From the Sea" and all of these concepts that we have to respond to our Nation's crises with a completely packaged force that has the fire support punch required to support the marines ashore. That needs to be fixed. I think those concepts address that gap.

Senator ROBB. Well, given the kinds of assets that you would marshall in an area where you were going to engage in littoral operations or whatever the case may be, what kinds of potential would this assault ship have that you would not have with the existing assets that are already available? Maybe that is a different way to come at it.

General JONES. Well, the first thing is range. The extended range guided munition that will be fired from the 5-inch gun will have pinpoint accuracy in excess of 60 miles.

Senator ROBB. But if you can launch cruise missiles and what have you at a much greater range——

General JONES. Sure.

Senator ROBB.—what new benefit does it bring to the equation? I say that not as someone who is opposed to it. The concept I like, but I am trying to make sure——

General JONES. The attractiveness of naval gunfire to a marine, sir, as you know as well as I, is not only the pinpoint range but also the area coverage that guns can give you. It is not, we are not just focused on pinpoint accuracy. We want volumes of fires as well, to meet a whole range of potential challenges.

But what we have to develop is a complementary system, where one system complements another. There is not going to be a silver bullet. It is not just going to be—in my opinion, it is not just going to be missiles or just gunfire or just air power. It has got to be a mix of the three.

The arsenal ship in its concept bridges that, to me bridges that gap and brings everything together on one firing platform. If we can do this with the vastly reduced numbers of crew that the technology will allow us to do, then I think you have a capability of supporting a force from the sea at ranges that we could not even anticipate in the past.

Senator ROBB. Is it realistic to be able to man 5-inch mounts and cruise missiles and some other sort of weapons from a ship whose complement is less than 100?

General JONES. The CNO and my Navy colleagues who are far more expert than I on this believe that it is. The technology allows you to do that with the integrated fire control systems that you would bring to bear.

Senator ROBB. In addition to the seagoing skills necessary to get the craft——

General JONES. I understand. I understand the question and I think those will have to be proven out in the concept, but that is the idea. As you know, manpower is very expensive, so anything we can do.

Senator ROBB. One other question, regarding the AAAV—I had occasion a year or two ago to go out and test drive a couple of the models that are in their current development stage, and it is clearly an important part of the whole Marine Corps concept of moving into the twenty-first century.

How dependent is the AAAV on some of the advances made in the mine-clearing and mine countermeasures that we are talking about right now? How closely are those two wed to each other?

General JONES. Sir, are you talking about LCAC's by any chance?

Senator ROBB. I am talking about the AAAV. You could put LCAC's in the same category.

General JONES. Yes, sir. The reason I mention LCAC's is because we have been developing—we have some programs with LCAC's that assist us in solving some of the aspects of the mine problem.

Senator ROBB. But the AAAV is going to have more exposure to mines than the LCAC.

General JONES. Yes, sir. AAAV, the reason that we are really working so hard to try to bring an organic capability into the fleet, which means that even the amphibs might have a capability of acquiring and even neutralizing some mines if you have to go through, the main thing we are trying to do is give the ships, the surface ships, a picture of what environment they are in, and then they can make decisions on how to deal with it.

Knowing where the mines are is very important. But once you know where they are, then you can go where they are not. If you have to neutralize them and if you have to clear a path, you want to do that before you ever put the AAAV through there. So they are very much a function of the overall campaign plan.

But if we have to go through mines, we will have to get rid of the mines first so the AAAV's can get through them.

Senator ROBB. Thank you, General.

Mr. Chairman, I thank you and I apologize, I am going to have to depart.

Senator COHEN. Thank you very much, Senator Robb. You raised a good question concerning this new concept. It sounds terrific as a concept, but I am not sure there has been any price tag associated with it. There has been no discussing what it would take in order to have an arsenal ship with the kind of mix that we are talking about as far as Tomahawks and 5-inch and so forth.

There is a lot of money, I assume, associated with such a concept. It will need a lot more study.

General Jones, you did not mention—you just mentioned LCAC's and as I recall the LCAC fleet is in some serious need of overhaul, is it not? There is a SLEP program for it?

General JONES. There is a SLEP program that we were provided $37 million to begin. The LCAC program is in good shape, and we need to address the service life extension plan and we are doing that in a measured way.

Senator COHEN. Anything in the budget this year for it?

General JONES. $37 million.

Senator COHEN. That was put in by Congress last year.

General JONES. Yes, sir, that is correct.

Senator COHEN. But anything in terms of the Navy or the Marine Corps' future planning for this program?

General JONES. Well, we are going to have 91 LCAC's by the time we are through, and we are going to be able to extend the service life of the LCAC's from 20 to 30 years as a result of the SLEP program. This is a good news story, I think, in terms of the operational utility of that vehicle. It has applications in mine warfare, it has applications in expeditionary warfare.

We see the vehicle being used more on the operational side than just a logistics hauler from over the horizon. It has really paid great dividends for getting things ashore and troops ashore.

Senator COHEN. There was another concept called an MCAC. That did not rate very high in your estimation?

General JONES. Well, the "M" in MCAC from my standpoint has to do with being multipurpose, as opposed to "mines." But it rates very high, and I think we are seeing the utility of the LCAC far in excess of what it was originally envisioned to do, and its reliability, maintainability. We need to upgrade some of the systems on it, but I think this is a very good, capable program, one that is on track. The SLEP money that was provided will guarantee that we will get another 10 years of service life out of it. I am very excited about LCAC's.

Senator COHEN. Let me pause here. Senator Warner, would you like to ask some questions? We have to complete our session by 10:00.

STATEMENT OF SENATOR JOHN WARNER

Senator WARNER. We do, because both of us will attend the other one.

Simply, I am glad you sort of led off, Mr. Chairman, with this subject. We all think in terms of, obviously, the importance of ships, but this is integral to the whole force structure of what you are doing. My question would go to the emphasis being placed on mine warfare—you covered all of that—and the consolidation of assets at Ingleside, Texas, to create the warfare center.

Is this important capability not being fully incorporated into the fleet? I do not quite follow that.

General JONES. Senator, the history of mine warfare until Desert Storm suggests that it was associated with the idea of a Cold War home port break-out, let the reserves do it, type of capability. Desert Storm focused us in a completely new direction, with the creation of the Expeditionary Warfare Division, the integration of PEO Mine Warfare, COMMINEWARCOM and myself as kind of the leaders, if you will, of the Navy's direction of mine warfare.

Under the CNO's recently published white paper, he challenges all of his Admirals—and I sent a copy to all the Generals in the Marine Corps as well—to think about mine warfare as coequal to any of the other warfighting specialties, that it is everybody's responsibility, that it cannot just be a stand-alone 911 force that nobody worries about until you need it, and by then it is too late.

He has asked us to develop a plan, which we have, to take the Navy from a purely dedicated force to a mix of organic and dedicated capabilities, which means we will have on board our surface combatants the capability to react to a mine threat, which we have not had before.

It is that kind of integration.

Senator WARNER. The transportation capability to move it, because you cannot have it integral to everything.

General JONES. You cannot have it integral to everything. But for example, this year we will send a battle group out with a remote minehunting system that is capable of, once in the water, operating eight to ten miles from the ship untethered and giving that battle group commander a picture of what his environment looks like, which he does not have now.

Now, right now, if he had to go in a mined area, he would have to stop, call Ingleside, Texas, depending on where he is on the globe, wait for the transit time, and do something about it.

Another example is this year we are deploying four ships, two in the Persian Gulf, two in the Pacific, that will be there permanently, and they are going to do the peacetime operations, such as the bottom mine mapping and the like, gather a lot of data for us that we currently do not have, so that the startup costs if we ever go into a contingency, the startup costs will not be nearly as extensively, nearly as long, and we will be able to respond to the crisis that much quicker.

Senator WARNER. Thank you, Mr. Chairman.

It is always a pleasure to see you, General. I have got to go to this next meeting.

Mr. Chairman, thank you very much.

Senator COHEN. Thank you very much, Senator Warner.

Admiral Williams, Admiral Pearson, we have allowed the marines to take most of the fire from this side of the desk here and we will continue our discussion with both of you in writing. We have a number of questions we would like to have answered for the record.

But due to the fact that we have to go to the full committee, we are going to cease this testimony, except for one comment from me. We are all impressed with what you have been doing in terms of addressing the shared concerns in the Marine Corps and the Navy.

Over the years there has been a lot of lip service, but not much in the way of budgetary support. There is one question that remains and that is program stability versus what I would call personnel turbulence. I will not be here next year to hold this hearing, but neither will any of you. The question becomes, you set something in motion and the real question is how steady and sure is that momentum or that synergy that you talked about and the determination to carry through these programs, because you will all have moved on, I will have moved on, and there will be different people sitting at the table.

A lot has to do with career promotion. Is this something, those who are involved in this particular aspect of mine countermeasures, is that a career path that is recognized by the Navy and given its due accord? All of those questions I guess need to be addressed, but not this morning.

If you have some assessment in terms of how deep the support is now for going down to those who are going to succeed, you would think it would be helpful in identifying that, because it is going to be an issue that we are going to face year after year after year, and hopefully we will have people as dedicated to the mission as the three of you.

Thank you very much.

General JONES. Thank you, Senator.

Senator COHEN. The subcommittee stands adjourned.

[Whereupon, at 9:57 a.m., the subcommittee was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1997 AND THE FUTURE YEARS DEFENSE PROGRAM

THURSDAY, MARCH 21, 1996

U.S. SENATE,
SUBCOMMITTEE ON SEAPOWER,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

DEPARTMENT OF THE NAVY'S SHIPBUILDING PROGRAMS

The subcommittee met, pursuant to notice, at 2:04 p.m., in room SR–222, Russell Senate Office Building, Senator William S. Cohen (chairman of the subcommittee) presiding.

Present: Senators Warner, Cohen, Lott, and Robb.

Committee staff members present: Romie L. Brownlee, staff director; and Christine K. Cimko, press secretary.

Professional staff members present: Steven C. Saulnier.

Minority staff members present: Creighton Greene.

Staff assistants present: John R. McLeod and Jennifer Wallace.

Committee members' assistants present: John H. Hoggard, assistant to Senator Cohen; Glen E. Tait, assistant to Senator Kempthorne; Andrew W. Johnson, assistant to Senator Exon; Steven A. Wolfe, assistant to Senator Kennedy; William Owens, assistant to Senator Robb; and John F. Lilley, assistant to Senator Lieberman.

Committee members' fellows present: Thurston E. Womble, fellow to Senator Lott.

OPENING STATEMENT OF SENATOR WILLIAM S. COHEN, CHAIRMAN

Senator COHEN. The subcommittee will come to order.

This afternoon, the Senate Armed Services Subcommittee on Seapower meets to review shipbuilding programs contained in the Department of Navy's defense authorization request for fiscal year 1997. Today we are going to concentrate on service shipbuilding programs and defer consideration of the submarine acquisition program for a later hearing. Our witnesses this morning are the Honorable John Douglass, the Assistant Secretary of the Navy for Research, Development and Acquisition; and Vice Adm. Joe Lopez, the Deputy Chief of Naval Operations for Resources, Warfare Requirements and Assessments.

My remarks today are going to be brief. It has already been established at earlier full committee hearings that the Navy considers procurement, particularly in the shipbuilding accounts, as its most important shortfall. The Secretary of Defense has acknowledged the need for additional procurement funding, but chose in this year's budget to defer it to future years.

At last year's shipbuilding hearing I expressed concern about the Navy shipbuilding, noting that funding was at the lowest level since immediately following World War II, and questioned whether similarly low levels across the future years program could be overcome by the relatively huge and historically unprecedented funding levels that will be required in the first decade of the next century to sustain the fleet at the level of 346 ships stipulated by the Bottom-Up Review.

This year very little has changed. Although this year's budget is somewhat higher than was projected last year, it falls well short of what will be necessary to maintain the fleet's force structure. I understand the constraints under which the Department of Navy prepared a shipbuilding plan for fiscal year 1997 and beyond. Our objective today is going to be to explore whether the Department's plan is cost-effective, whether the ships the Navy needs most are in it, and what the highest priorities are if this subcommittee decides that it is appropriate to recommend additional funding.

The Secretary of the Navy and the Chief of Naval Operations have already testified they support this approach the subcommittee used last year of bringing ships forward from out-years to reduce future funding requirements and to permit more efficient acquisition. They have also testified that their highest priority, if additional funding becomes available, is the advanced procurement needed to build nuclear attack submarines in fiscal year 1999. We will accept their testimony as a point of departure for today's hearing.

I am pleased to welcome Mr. Douglass, a man well known to this subcommittee for his distinguished prior service. It is his first appearance before the subcommittee, and we know that his opinions will be expressed in a straightforward, candid fashion that we have come to know over the years. We also welcome Admiral Lopez, who has appeared many times before this subcommittee, and never failed to provide both clear, illuminating, and lucid testimony. We think that will be continued today. Gentlemen, we welcome you before the committee.

Senator Warner, do you have a comment?

Senator WARNER. Mr. Chairman, no. Thank you very much, and thank you for your support on the programs, particularly the submarine program here now for over 2 years of working with me on it. I want to thank you.

Senator COHEN. Senator Robb.

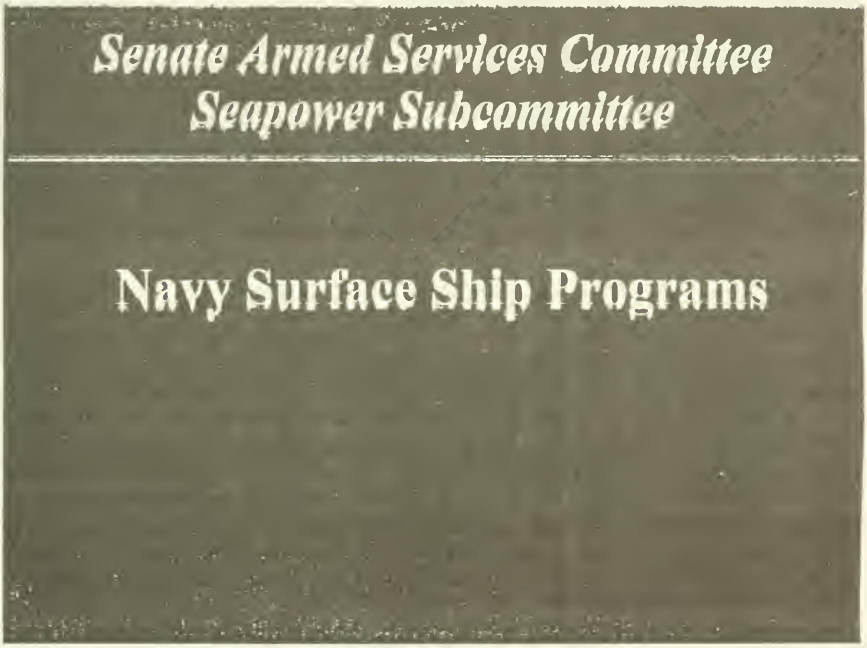
Senator ROBB. Thank you, Mr. Chairman. I think we are going to probably be interrupted by a vote shortly, and I think we had best get to as much testimony as we can. Thank you.

Senator COHEN. John.

STATEMENT OF HON. JOHN W. DOUGLASS, ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH, DEVELOPMENT AND ACQUISITION; ACCOMPANIED BY VICE ADM. THOMAS J. LOPEZ, USN, DEPUTY CHIEF OF NAVAL OPERATIONS FOR RESOURCES, WARFARE REQUIREMENTS AND ASSESSMENTS

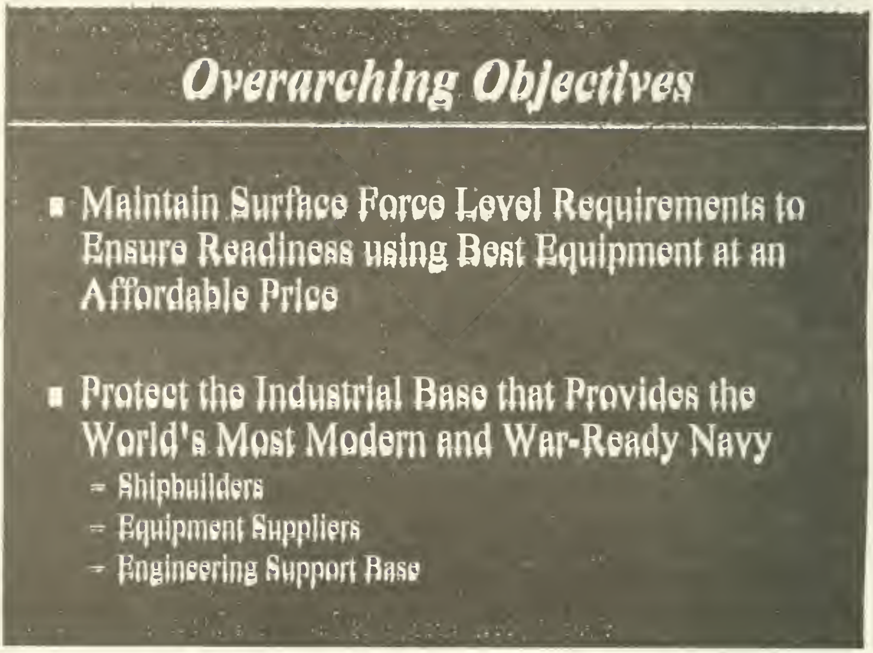
Mr. DOUGLASS. Thank you, sir. If I might I would like to enter into the record Admiral Lopez's and my prepared statement. Rather than go through this statement in detail, sir, what I have is a short oral presentation with a series of charts which I would just like to move through very quickly to give you an overview of our ship acquisition program for this fiscal year, 1997, and then immediately go to any questions that you and the other members may have.

May we have the first chart, please? [Charts 1 and 2.]



Senate Armed Services Committee
Seapower Subcommittee

Navy Surface Ship Programs



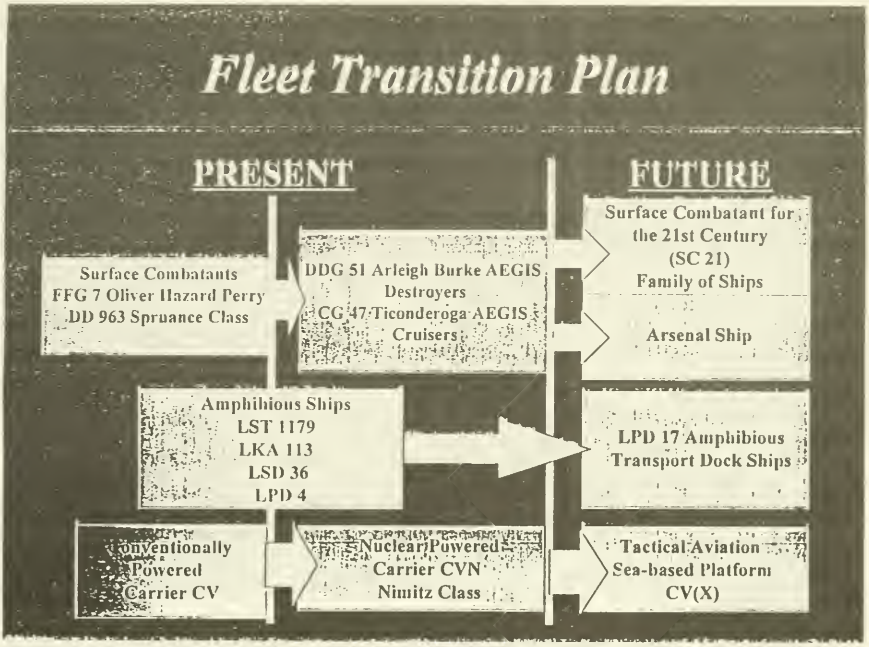
Overarching Objectives

- Maintain Surface Force Level Requirements to Ensure Readiness using Best Equipment at an Affordable Price
- Protect the Industrial Base that Provides the World's Most Modern and War-Ready Navy
  - Shipbuilders
  - Equipment Suppliers
  - Engineering Support Base

Mr. DOUGLASS. This chart sets the tone and objectives for our fiscal year 1997 budget, is just by way of setting the tone, sir. You have already pointed out that there are force structure problems in the future. We know that, and we are doing the very best we can to figure out how we are going to accommodate them. We also know we have industrial base issues as one of the issues: I have been in this job 148 days now and I believe I have spent probably 60–70 percent of that time working on the overall issue of how to improve the maritime industrial base. I really believe we have to think outside the box, and at the end of this briefing I will have a few comments on things that I think we need to do to stimulate commercial shipbuilding.

I recall, Senator Robb, a visit you and I made to Norfolk. We were talking about that issue. I should also note that I have also been there with Senator Warner, as well. So I will close my comments on some things that I think we need to do to stimulate shipbuilding.

May I have the next slide, please? [Chart 3.]



Fleet Transition Plan

PRESENT

FUTURE

Surface Combatants
FFG 7 Oliver Hazard Perry
DD 963 Spruance Class

DDG 51 Arleigh Burke AEGIS
Destroyers
CG 47 Ticonderoga AEGIS
Cruisers

Surface Combatant for
the 21st Century
(SC 21)
Family of Ships

Arsenal Ship

Amphibious Ships
LST 1179
LKA 113
LSD 36
LPD 4

LPD 17 Amphibious
Transport Dock Ships

Conventionally
Powered
Carrier CV

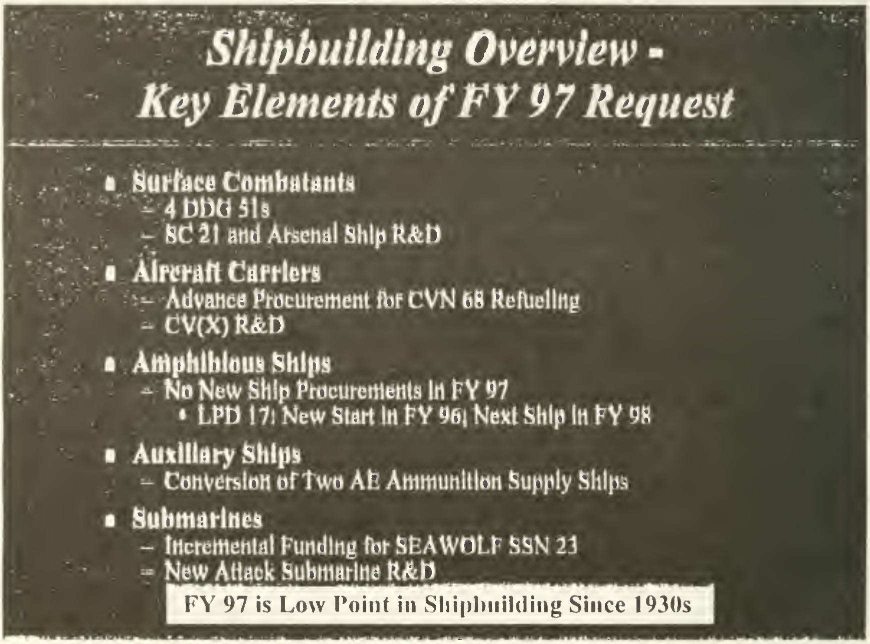
Nuclear Powered
Carrier CVN
Nimitz Class

Tactical Aviation
Sea-based Platform
CV(X)

Mr. DOUGLASS. This is just a reminder that we are in what many people might call a transition period, sir. Whereas we all know the Cold War is over, we are restructuring the Navy for a different type of mission than it had during the Cold War period. We are now in a period of time in which we are beginning a series of new programs.

As you know, we are toward the latter part of our *Arleigh Burke* DDG 51 program. It has been very successful. It is at the very center of our surface fleet force structure, and we have to make some big decisions regarding this program. We are on the verge of source selection on the LPD 17. We are starting research and development on these things that you see on the right, the new SC–21 surface combatant, and the Arsenal Ship. We have to start considering what our next aircraft carrier is going to look like. Those are all research and development programs that are beginning in one way or the other this year.

Next chart, please, and we will go through each one of those in some detail. [Chart 4.]



Shipbuilding Overview - Key Elements of FY 97 Request

- **Surface Combatants**
  - 4 DDG 51s
  - SC 21 and Arsenal Ship R&D
- **Aircraft Carriers**
  - Advance Procurement for CVN 68 Refueling
  - CV(X) R&D
- **Amphibious Ships**
  - No New Ship Procurements in FY 97
    - LPD 17: New Start in FY 96; Next Ship in FY 98
- **Auxiliary Ships**
  - Conversion of Two AE Ammunition Supply Ships
- **Submarines**
  - Incremental Funding for SEAWOLF SSN 23
  - New Attack Submarine R&D

FY 97 is Low Point in Shipbuilding Since 1930s

Mr. DOUGLASS. This is a quick summary of what is in the fiscal year 1997 request. Regarding the DDG 51's—we have essentially four ships. We are trying to comply with the committee's direction to do six ships in 2 years to stabilize the program.

Senator COHEN. Has that been helpful to you?

Mr. DOUGLASS. Yes, sir. That has been very helpful to us, and I will have a separate chart on that. I think by going down that path, sir, we are going to be able to save almost $300 million by doing 2 years together. As a matter of fact, this committee, in my opinion, did the responsible thing. We had some direction, as you know, from the appropriations side, to buy three ships but just providing two ships worth of money. This committee was more responsible in my view, and said here is how we think you can stabilize this program, by allowing six ships over 2 years. It was very helpful, and I have done everything I can to get the contracts ready to implement that methodology.

Senator COHEN. Do you intend to try to continue that process?

Mr. DOUGLASS. Yes, sir, and I will speak to that in some detail.

We have refueling money in the budget for CVN–68, and we are just starting on the R&D for the CVX. There is no LPD 17 money in the President's budget this year. We know there are some people who would like to look at that, and we would be glad to talk about that, if you are interested. We are going to convert two ships to ammunition carriers.

I know although it is not the subject of this hearing today, we have some very big decisions to make on the new attack submarine. I have spent a couple of hours today briefing Dr. Perry and his team on our Navy submarine plan. As we speak, there are decisions being made at the Pentagon as to what they want to do with our plan. We are hopeful that they will take our plan and very quickly transmit it to the Hill.

Senator WARNER. On that, Mr. Chairman, I understand that you have invited a number of us to a signing ceremony on the submarine tomorrow, is that correct?

Mr. DOUGLASS. Yes, sir. There have been invitations extended and that was the plan, that we would have members of Congress come to the Pentagon and witness the agreement.

Senator WARNER. But the point is it sounds as if this plan was in evolution with Perry this morning and decisions are being made, and it is all going to be done between now and whatever it is—10 tomorrow morning, or 9:30.

Mr. DOUGLASS. There are two aspects to this, Senator Warner. The congressionally mandated day for us to deliver the plan to Congress is next Tuesday, the 26th of March. The Navy delivery of the plan supported the public announcement of the contents of the plan on that date. One of the subcomponents of the plan was starting a competition between Newport News and Electric Boat. The agreement between those two yards, the Navy felt, was relatively independent of some of the details in the bigger plan. So the scheduling of the signing ceremony was intended to be a step on the way to release of the plan.

Senator WARNER. But it is not the subject of what took place this morning and is taking place now?

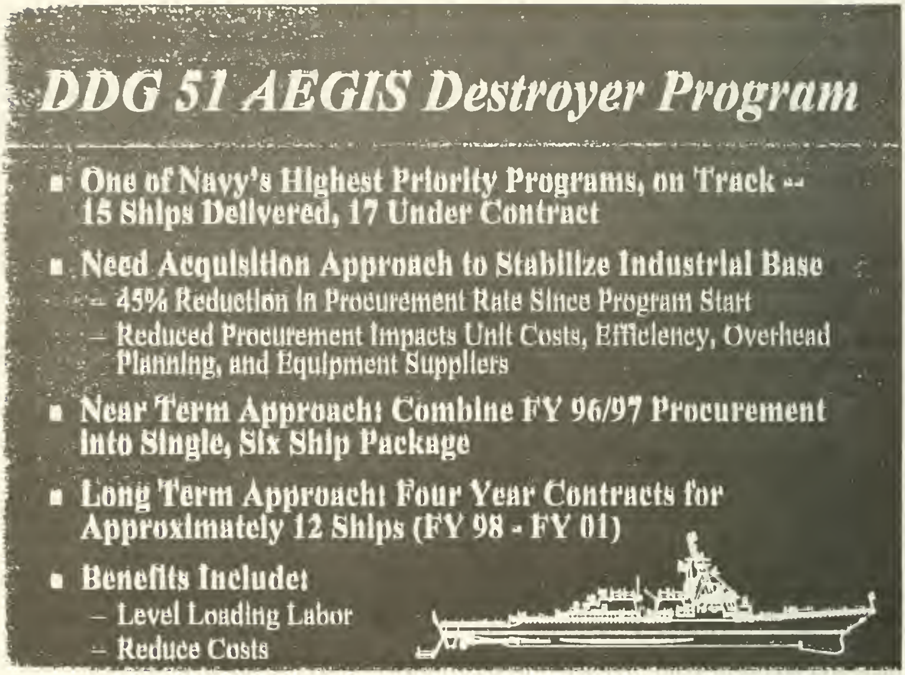
Mr. DOUGLASS. Sir, what they are talking about right now is—are they going to be able to make next Tuesday or not? How much review do they want to put into the program before OSD announces it? There are some in the building who believe that if they need more time than Tuesday to announce the plan, maybe we ought to put off the signing ceremony. But I certainly do not mean to prejudice that decision in any way by bringing it up here. I just wanted to let you know.

Senator WARNER. New attack submarine R&D, should that not be new attack submarine program R&D? The word program should be put in there.

Mr. DOUGLASS. Yes, sir. I would not object to reading it that way. This was just to remind the Members of this committee, although this hearing today is not on submarines, that submarines are an important part of our shipbuilding plan for fiscal year 1997. We thought it would be worse if we left it off than if we had a bullet on the chart just to remind everybody.

Senator COHEN. The chairman will take judicial notice that the Senators from Virginia have an abiding interest in the submarine program. [Laughter.]

Mr. DOUGLASS. Let us go to the next chart. [Chart 5.]



DDG 51 AEGIS Destroyer Program

- One of Navy's Highest Priority Programs, on Track -- 15 Ships Delivered, 17 Under Contract
- Need Acquisition Approach to Stabilize Industrial Base
  - 45% Reduction in Procurement Rate Since Program Start
  - Reduced Procurement Impacts Unit Costs, Efficiency, Overhead Planning, and Equipment Suppliers
- Near Term Approach: Combine FY 96/97 Procurement into Single, Six Ship Package
- Long Term Approach: Four Year Contracts for Approximately 12 Ships (FY 98 - FY 01)
- Benefits Include:
  - Level Loading Labor
  - Reduce Costs

Mr. DOUGLASS. I know this program will be of more general interest to the committee. This is our DDG 51 program.

Senator COHEN. I have a marginal interest in this one. [Laughter.]

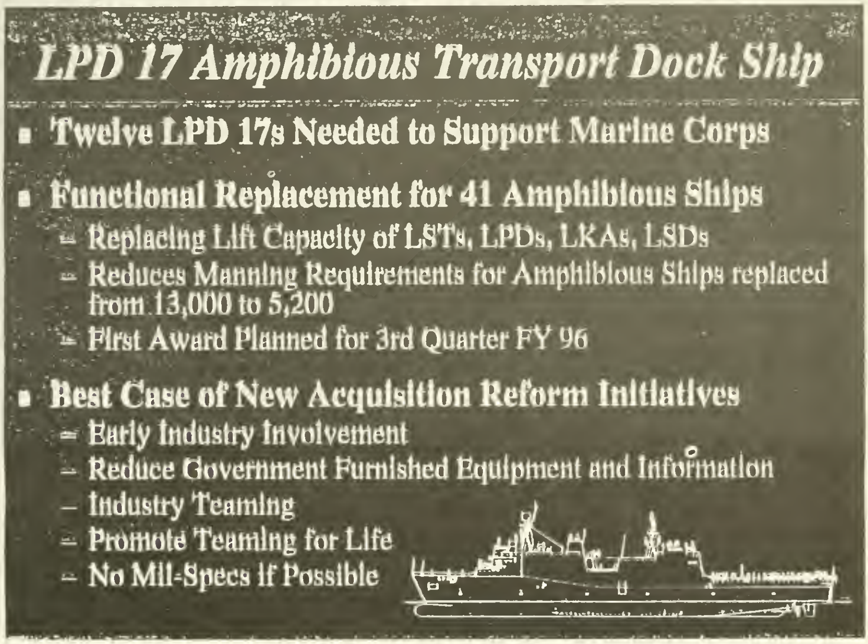
Mr. DOUGLASS. Yes, sir. This program is on track and it is a success. I will not go through the bullets here. The third bullet is the one that you and I were talking about. We want to combine the fiscal year 1996–1997 budgets so we can buy six ships over 2 years. In order to do that, we have a reprogramming on the Hill right now to do the advanced procurement so we can get started this fiscal year and we do not have to wait until you finish your work this year.

Getting a reprogramming through is going to save us approximately $300 million, as I said before. It keeps us on the track of keeping these yards on their pace of two and one, and two and one. I strongly support that, and I urge this committee to do everything in its power to see that that reprogramming moves expeditiously through. My commitment to you is that I am ready to go with the contracts to get this implemented as soon as we get the money. We will all benefit—the taxpayers, the Navy, and the Congress, because we will be able to get this program stabilized.

I would also mention to you that for the next increment of buys I believe the committee should look at a longer buy period. This 2-year increment has worked very well. I think we should look very carefully at a 4-year increment for the next time around. That would allow me to save almost $1 billion to dedicate towards this objective that you mentioned in your opening statement of getting our shipbuilding program to the point where we can support the requirements of our war-fighters.

I will be glad to provide any information to the committee that might be needed as you go through your markup this year, because you may wish to consider that program as you conduct your fiscal year 1997 markup.

Can we have the next chart, please? [Chart 6.]



LPD 17 Amphibious Transport Dock Ship

- Twelve LPD 17s Needed to Support Marine Corps
- Functional Replacement for 41 Amphibious Ships
  - Replacing Lift Capacity of LSTs, LPDs, LKAs, LSDs
  - Reduces Manning Requirements for Amphibious Ships replaced from 13,000 to 5,200
  - First Award Planned for 3rd Quarter FY 96
- Best Case of New Acquisition Reform Initiatives
  - Early Industry Involvement
  - Reduce Government Furnished Equipment and Information
  - Industry Teaming
  - Promote Teaming for Life
  - No Mil-Specs if Possible

Mr. DOUGLASS. This is our LPD 17 program. This is an example of one of the things that the leadership of this committee accomplished last year by moving up the lead ship in this class. I am here to tell you that I have been involved, in the 147 days I have been over there, in the way in which we are going to buy this ship. When I arrived they had about 1,000 military specifications in the RFP. Today we have zero, sir. This is going to be the model for future shipbuilding programs in the Navy.

The staff was able to get the number of specifications down from around 1,000 down to 153, and in the final scrub I was able to move that number from 153 down to zero. We can go forward now and say we are using the maximum amount of commercial know-how that we can. We are asking our shipyards to work with us, and we know they are out there teaming to bid on this project. I am very upbeat on this program.

Senator COHEN. Could I ask you, the CNO, when he was asked the question what would he do in terms of this list of priorities if he had additional funding, he listed an additional LPD–17 for fiscal 1997.

Mr. DOUGLASS. Yes, sir.

Senator COHEN. The question on the traditional mode of procurement is as you procure the first ship you have a break and then you go on to the second ship after the break. That would break that tradition as such by moving it up the 1 year hiatus. Can you tell us, is there any danger in going forward without the 1-year break, and what are the advantages that that would have?

Mr. DOUGLASS. Sir, the way I would approach that would be instead of buying it early in fiscal year 1998, I would buy it late in fiscal year 1997. I think there is enough flexibility in the way in which our funding is established to allow me to put a respectable period of time in between the first ship and the second ship.

I think we would have to be careful of the dangers of accelerating it too rapidly. But if we were to undertake the second ship in late fiscal year 1997, I think we could do a credible job in getting the second ship underway. It would save us some money, and I think, sir, we would be in favor of that. But, we would certainly be aware of the concern that you raise about rushing too quickly.

Senator ROBB. Do the advantages of getting additional sealift quicker outweigh whatever the disadvantages might be?

Mr. DOUGLASS. Yes, sir. The quicker we get this into the fleet, the sooner we can save money.

One of the new initiatives Mr. Chairman, that I have really put a lot of emphasis on, including going out and getting a specialist on my immediate staff in the Secretariat, is getting the life-cycle cost of ships down. The way you get the life-cycle cost of ships down, one of the most preeminent ways, is you get the number of crew off the ship. You will see when I discuss the Arsenal Ship, the Smart Ship, and other things, we are trying to use technology to bring crew sizes down.

When this program is fully implemented, the number of crew members falls from 13,000 down to 5,200. When you think of the pay off of such a reduction in crew over the life-cycle of these ships you are talking billions and billions of dollars. As a matter of fact, with the implementation of this ship program and the acquisition reform measures that I have put in place, we have estimated the Navy will be able to avoid about $15 billion in cost. So the sooner we do this, the better off we are, sir.

Senator COHEN. How far along are you in completing your opening statement? I think this might be a good place for us to take a break, unless you can complete it in the next 4 or 5 minutes.

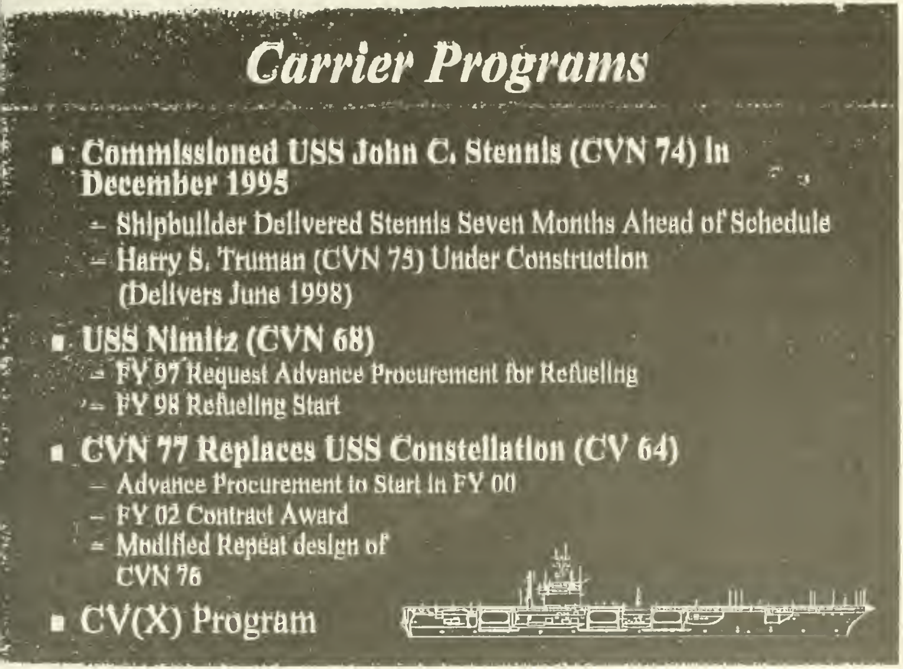
Mr. DOUGLASS. I am about halfway through at this point.

Senator COHEN. Why do we not take a break here, and then we will come back? There may be back-to-back votes, so we will just stay on recess for anywhere from 13 to 20 minutes.

Mr. DOUGLASS. We are at your disposal, sir. [Recessed 2:21 to 2:39.]

Senator COHEN. The committee will return to order. Mr. Douglass, why don't you continue?

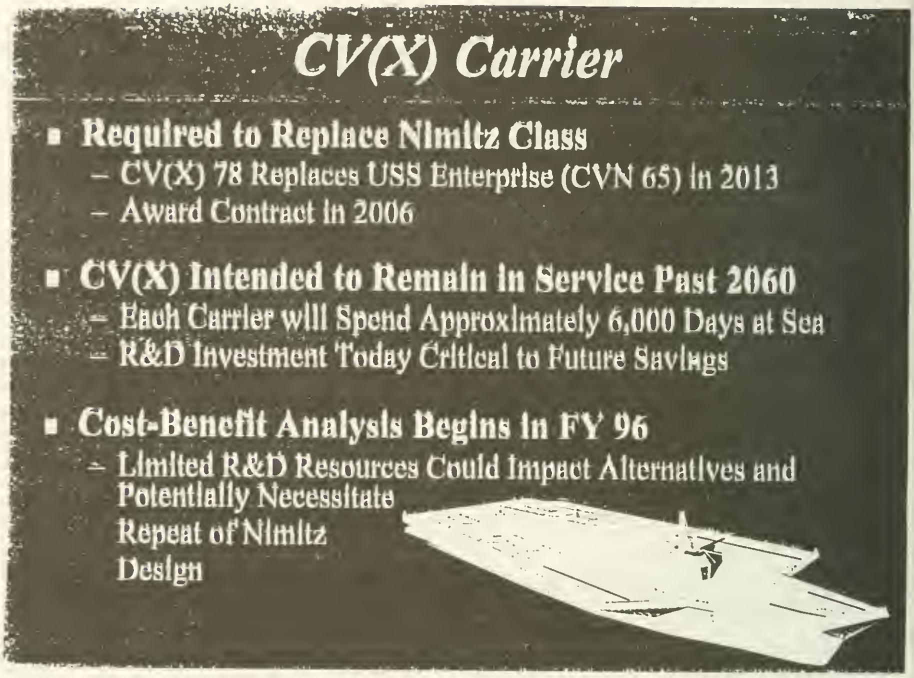
Mr. DOUGLASS. Yes, sir, I will try to move quickly through this so that you and the others can get to the questions, which I know you must have. [Chart 7.]



Carrier Programs

- Commissioned USS John C. Stennis (CVN 74) in December 1995
  - Shipbuilder Delivered Stennis Seven Months Ahead of Schedule
  - Harry S. Truman (CVN 75) Under Construction (Delivers June 1998)
- USS Nimitz (CVN 68)
  - FY 97 Request Advance Procurement for Refueling
  - FY 98 Refueling Start
- CVN 77 Replaces USS Constellation (CV 64)
  - Advance Procurement to Start in FY 00
  - FY 02 Contract Award
  - Modified Repeat design of CVN 76
- CV(X) Program

Mr. DOUGLASS. The next carrier coming down the line in terms of new construction is CVN 77. We do not need money this year in the budget. We will need advanced procurement starting in fiscal year 2000. We expect that ship will be largely similar to the ones we have already built, but we are starting RDT&E this year on CV(X), which is the next generation carrier. If I could have the next chart please. [Chart 8.]



CV(X) Carrier

- Required to Replace Nimitz Class
  - CV(X) 78 Replaces USS Enterprise (CVN 65) in 2013
  - Award Contract in 2006
- CV(X) Intended to Remain in Service Past 2060
  - Each Carrier will Spend Approximately 6,000 Days at Sea
  - R&D Investment Today Critical to Future Savings
- Cost-Benefit Analysis Begins in FY 96
  - Limited R&D Resources Could Impact Alternatives and Potentially Necessitate Repeat of Nimitz Design

Mr. DOUGLASS. This ship has the potential to be something radically different. The important thing to note about this program, Mr. Chairman, is that we have put R&D money in the budget before to get started on the research and development for this program, and your committee has been very supportive of us, but we have had a lot of trouble getting the money through the appropriations cycle. Every year we have put money in and somebody over there takes it out. We are getting down to the point now where, if you really want a new class of carriers, we have got to get started.

If I start this year with a reasonable amount of money, I can get the keel laid on the ship in 2006. She will go to sea in 2013, and she will be in the inventory all the way to 2063.

This ship will carry not only the F/A–18E/F but the JAST, the son of JAST, and probably the grandson of JAST. This ship, sir, will serve over 100,000 sailors who will make this ship their home. God knows how many million miles she will steam in that 50-year life span.

Senator COHEN. But not at one time.

Mr. DOUGLASS. No, not at one time. Hopefully substantially less than what we have on the carriers today.

Senator COHEN. Are there stealthy characteristics to this?

Mr. DOUGLASS. There could be, sir. We would not rule that out.

What I am trying to do, sir, is establish a ship's architecture that is open. In other words, I would like for us to be able to think that this ship could go through evolutions in its mission and still have utility.

We are especially concerned about designing her combat systems so that they are modular. When new technology becomes available put new systems in so that we can take advantage of our basic investment in the hull and the structures.

Senator COHEN. Where are you now in the design?

Mr. DOUGLASS. We are just getting started. I think there is only $6 million in this year's budget for it. My point for all of these comments is we really need to start on this, and we really need your help to get this project started.

Just by way of comparison in terms of the amount of money it takes to do the research and development for this, as I recall, and please do not chisel these in concrete, because I am just giving an estimate but I think there is about $1.2 billion or $1.3 billion in R&D money in order to design this ship.

Typically, when we design a new strike airplane, it costs us about $20 billion. If we have four generations of strike airplanes that will fly off this ship's deck, just the R&D on those airplanes would be in the neighborhood of $80 billion, and then when you add the weapons, it will be well over $100 billion, and that is not even to buy them.

So we think a prudent investment of a little over $1 billion for the first ship of the future carrier force for the Navy is a prudent investment. We are starting very modestly, but we do need to get going on that, and we would appreciate your help.

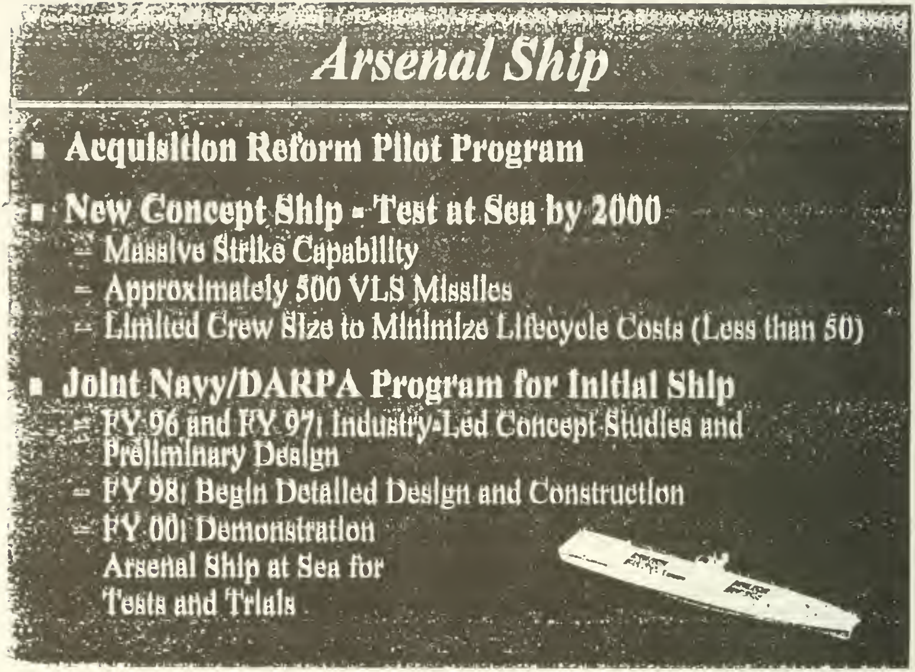
Senator COHEN. What is the number this year?

Mr. DOUGLASS. It is $6 million, but it rapidly ramps up. It goes from $6 million to $40 million, then up to $200 million in the next couple of years.

Senator COHEN. When is the design—you were talking about this being awarded 2013.

Mr. DOUGLASS. 2013 would be when she would go to sea. Her keel would be laid in 2006, so the contract award for the actual construction of the ship probably would be around 2004, or 2005, something like that.

May I have the next chart, please? [Chart 9.]



Arsenal Ship

- Acquisition Reform Pilot Program
- New Concept Ship - Test at Sea by 2000
  - Massive Strike Capability
  - Approximately 500 VLS Missiles
  - Limited Crew Size to Minimize Lifecycle Costs (Less than 50)
- Joint Navy/DARPA Program for Initial Ship
  - FY 96 and FY 97: Industry-Led Concept Studies and Preliminary Design
  - FY 98: Begin Detailed Design and Construction
  - FY 00: Demonstration Arsenal Ship at Sea for Tests and Trials

Mr. DOUGLASS. This is our Arsenal Ship. It is one of our examples of acquisition reform. Sir, you will notice they have drawn an artist's conception there of the Arsenal Ship. We very carefully noted the membership of this committee when we drew that hull design for the Arsenal Ship.

Senator COHEN. I am sorry?

Mr. DOUGLASS. Sir—I was saying when we drew the picture on the chart here——

Senator COHEN. As I understand it, it is conceptual only.

Mr. DOUGLASS. Yes, it is conceptual only, but the version that you see there is one of a number of which we are evaluating. This one is a derivative of the DDG 51 hull. What we have now is a program that has just been started by the Chief of Naval Operations, the Director of DARPA and myself.

We are putting in $350 million. DARPA is putting in $170 million. DARPA will start out as the program manager of this program, then it will transition to the Navy. We have set some objectives. It is going to be what we call "cost as an independent variable". In other words, we are going to say this is the amount of money that we can afford to invest in the first ship, and everybody is going to have to design a ship under those costs.

We are going to go through a concept definition phase and the reason for that is, I have literally dozens of proposals that have already been submitted to me on an unsolicited basis from shipyards all over the country, who are interested in this project. Shipbuilders from Maine to Florida, to California, to Oregon have approached me with ideas on this.

We want to very quickly get all these ideas into a formal process, pick the best, probably three, then shrink down quickly to two and then go build the ship.

We think we can get the first one to sea by 2000, and we think we can do it with the money that we have proposed. We would like to see the crew size be under 50, hopefully closer to 20.

Senator COHEN. I am not sure what it looks like, or what it is going to do, but my initial understanding at least is that it is going to be a very expensive proposition if you are talking about the kind of mix of cruise missiles and maybe 5-inch guns and other types of ship-to-shore type of fire power, and it would cause, I assume, some modification in terms of the design of the cruise missiles themselves.

Mr. DOUGLASS. No, sir, that is not the concept that we have.

Senator COHEN. Then tell me the concept.

Mr. DOUGLASS. Yes sir, let me take you back to something I know that you recall. You know that Paul Kaminski and I were the two of the people who were the originators of the F–117 stealth fighter. That was a radically new concept, and you know how successful it has been.

We were able to bring that airplane, from an idea that Paul and some others in ARPA had, into two squadrons in a secret base in the desert. In 6 years we returned to the Department over $400 million, from our program budget. It was one of the most successful airplane programs ever managed by the Air Force.

We made a very simple rule at the beginning of that program.

Senator COHEN. Do not tell anybody about it.

Mr. DOUGLASS. Sir, we said no inventions. [Laughter.]

Mr. DOUGLASS. The only thing that could be invented in that program was the external shape of the airplane. We used existing landing gear, existing avionics, existing engines, existing ejection seats—everything inside we picked off somebody else's program.

What Larry Lynn and I are doing in this program is the same thing. We are saying, this has got to use the same missiles that are used in the rest of the fleet, the same communications, the same existing hull forms. We want to use the same everything, and it is an integration task of putting all these things together.

The basic concept of operations is that if we are going to go forward to fight somewhere far away, we cannot carry all of the cruise missiles and standard missiles and other kinds of missiles we need to fight an extended campaign in standard surface ships like the DDG 51's. So how do we get them over there? We load them on surface ships, we ship them into the area, we take them off the surface ships, and store them somewhere, then we put them back on a combatant again. We take them out of the fleet. We handle them a lot.

The idea here is that we would just put these weapons into a ship that could go immediately to the war zone. They could be fired right off that ship and engage the enemy. That is the basic concept.

Senator COHEN. But I assume this would not be a ship going alone.

Mr. DOUGLASS. No, sir.

Senator COHEN. It would have to be a surface combatant.

Mr. DOUGLASS. Part of the fleet.

Senator COHEN. You have an ammunition dump, basically, that you are hauling across the ocean, and it would be a prime target.

Mr. DOUGLASS. Exactly, but we do that anyway. I mean, when we carry our munitions forward, we have ships chock-full of these systems.

Senator COHEN. But protected.

Mr. DOUGLASS. But protected, so why not be able to launch them right off the ship that gets them into the area?

There are many innovative concepts. I have even heard people are talking about just building canisters that could be put on commercial ships. We would not have to have any ships during peacetime. Rather, we would put these canisters in various places around the world, and then when war came we could put them in the hulls of the ships with just a few sailors, along with communication devices, and we would be able to get them into the theater.

So we are going to look at everybody's ideas, and then very quickly go forward with them.

Senator COHEN. What kind of parameters are you looking at in terms of the cost per ship?

Mr. DOUGLASS. We have set a goal that the entire front end of the program cannot cost more than $520 million.

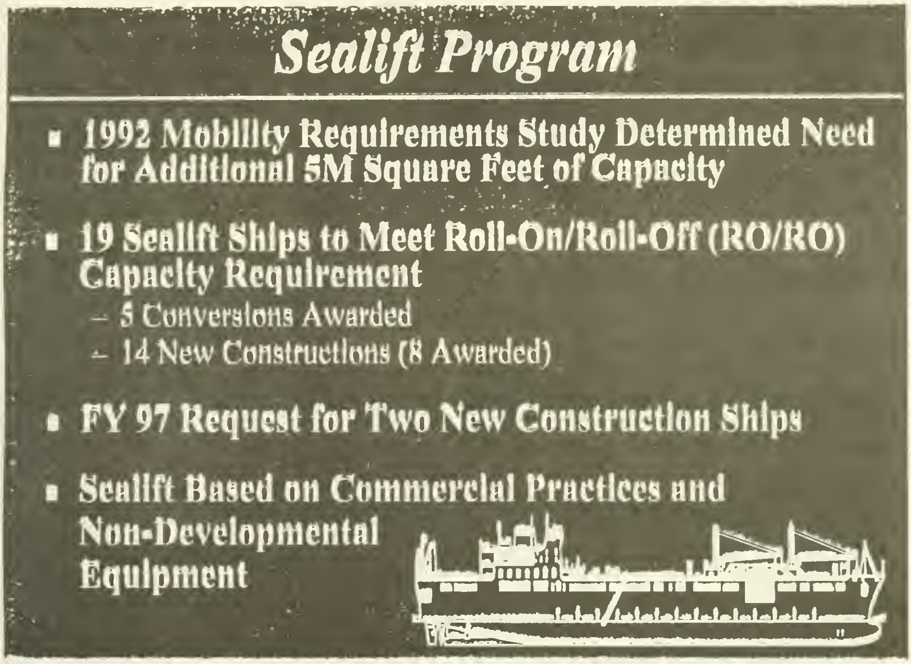
Senator COHEN. Are you talking about design now?

Mr. DOUGLASS. The design and construction of the first ship, yes, sir. The program will have competition up front, which is going to make the effort to get started more affordable. We have some money in this year's budget to move us down this path.

Senator COHEN. That would be superior to just having more *Arleigh Burke* destroyers?

Mr. DOUGLASS. Well, it would not be superior. I mean, obviously the *Arleigh Burke* is so flexible and valuable it can do many, many things. But the Arsenal Ship concept would be much, much cheaper in terms of cost per shot out the barrel, because you would have it all aggregated in one very inexpensive platform, and we are not envisioning a platform that would have near the flexibility of an *Arleigh Burke*. It would not have big radars, it would not have the self-protection capability and so on. It would be dependent on *Arleigh Burke* to guard it.

Senator COHEN. [Chart 10.]



Sealift Program

- 1992 Mobility Requirements Study Determined Need for Additional 5M Square Feet of Capacity
- 19 Sealift Ships to Meet Roll-On/Roll-Off (RO/RO) Capacity Requirement
  - 5 Conversions Awarded
  - 14 New Constructions (8 Awarded)
- FY 97 Request for Two New Construction Ships
- Sealift Based on Commercial Practices and Non-Developmental Equipment

Mr. DOUGLASS. The next program, sir, that I want to very briefly mention to you is our Sealift program.

Senator COHEN. By the way, could I just ask you where you got the money for the design competition?

Mr. DOUGLASS. We started with a very modest below-threshold reprogramming this year. The real beginning of the program is at your discretion. We have asked for some money, and DARPA has asked for some money in the fiscal year 1997 budget, so to really make this project go, your committee has to approve it.

All we are doing now is just taking a little money in 1996 to get it off dead center. We need to get a program manager, and we need to get started.

The Sealift program is one that this committee knows got off to a troubled start. I have reviewed it a couple of times, and I am convinced that we have got it stabilized now. The original ships were conversions.

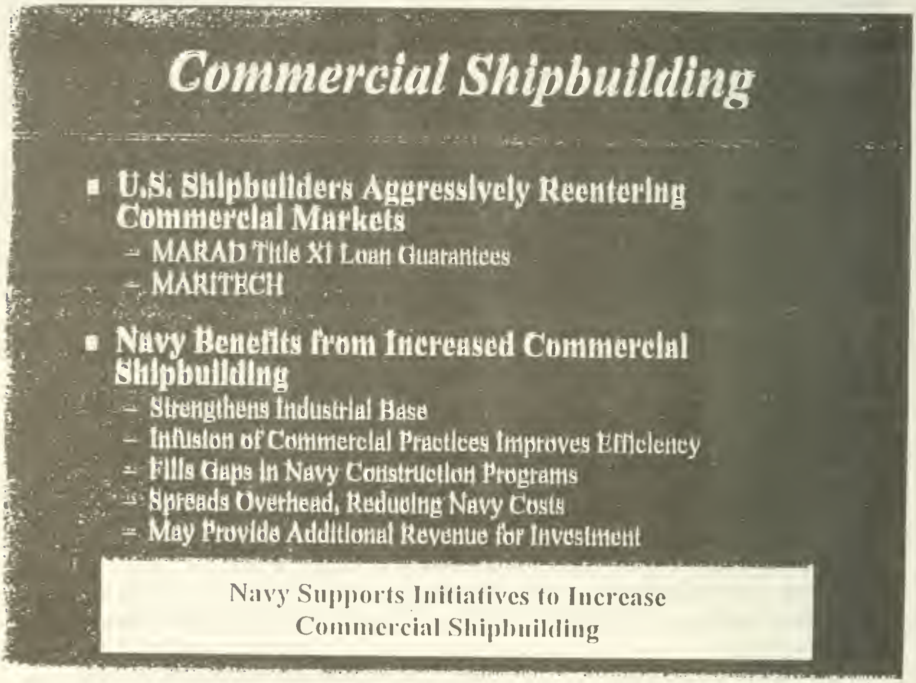
The Navy did not want to do conversions in the beginning, and there was much debate back and forth. We finally were told by the Congress to get off dead center and do some conversions, so we did them, but we got started late, and because they were late, they did some hurried-up things, and they made some mistakes.

As a result, bad decisions were made both on the Government side and our shipbuilders' sides. When we got into the conversion projects we found out that they were more complex than we had thought, both we and the shipbuilders, and we had some overruns on those early conversions. The program got behind schedule, but I have been keeping an eye on it.

Secretary Dalton has gone out of his way several times to make it clear to me that he wants me to keep a close eye on this program.

I know that TRANSCOM is not happy with the delivery dates that have been established, but they have not slipped in the 147 days that I have been there. The overrun has gone down by about 30 percent since I arrived. I think we have it stabilized now.

We awarded two new ships this fiscal year, thanks to the initiatives of this committee, and we have options for four more, then we plan to buy the final two if we buy out the entire program. It is one program that has had a troubled past, but I feel reasonably certain that, with some close management control, it is going to be OK. [Chart 11.]



Commercial Shipbuilding

- U.S. Shipbuilders Aggressively Reentering Commercial Markets
  - MARAD Title XI Loan Guarantees
  - MARITECH
- Navy Benefits from Increased Commercial Shipbuilding
  - Strengthens Industrial Base
  - Infusion of Commercial Practices Improves Efficiency
  - Fills Gaps in Navy Construction Programs
  - Spreads Overhead, Reducing Navy Costs
  - May Provide Additional Revenue for Investment

Navy Supports Initiatives to Increase Commercial Shipbuilding

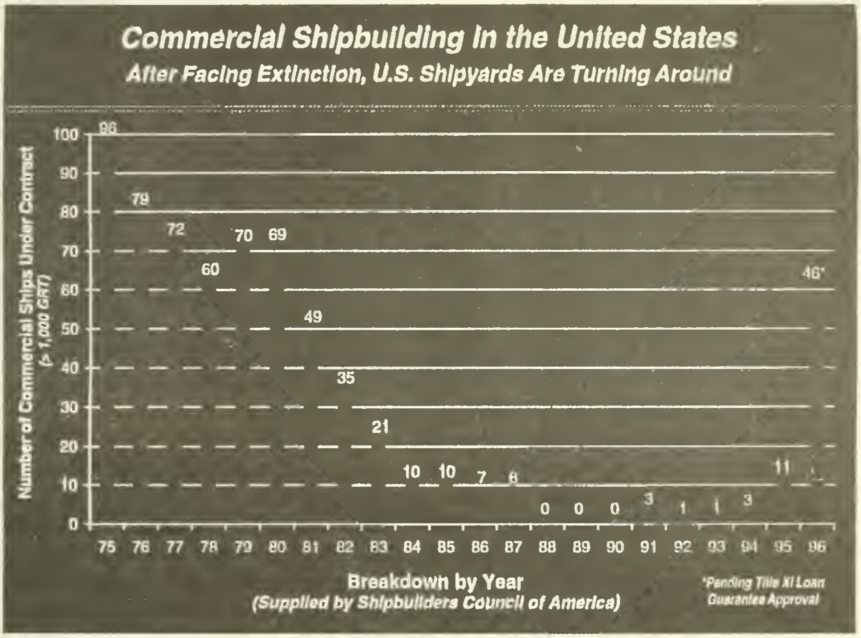
Mr. DOUGLASS. I want to switch a little bit here and talk about a subject that I think is important. When I came to this job, sir, I came with some background in industrial base policy. I had worked on industrial base issues in the Air Force, and you know my 4 years here working with Senators Bingaman, Smith, and Coats on industrial base issues.

One of the things that has always troubled me is that our country has not paid attention to its maritime industrial base, and I feel very strongly that, while we have emphasized aviation, railroads, and roads in this country, we have not paid enough attention to our maritime industrial base. I am committed to helping change that.

The Navy has not always been committed to that course. As a matter of fact, I have had a couple of ex-Secretaries and Assistant

Secretaries of the Navy come to me and say, John, do not waste your time on this, stick to the Navy ships, and do not worry about commercial shipbuilding. But I believe that if we can get more commercial shipbuilding done in this country, it will help all of our shipyards, large and small. I have been spending a considerable amount of time working this program.

If I could have the next chart, I just want to show you what is beginning to happen. [Chart 12.]



Mr. DOUGLASS. If you will look at the green, those are ships built in the United States, commercial ships and, as you can see, they gradually dwindle down to the point where, in 1987, we built the last six. In 1988 through 1990, we built zero.

To me, for a great maritime Nation like the United States, that is a tragedy. That is the only way I can say it. Now, we started back up again, and we have hope of revitalizing this industry.

I am a strong advocate of loan guarantee programs, and the MARITECH program. All of our big shipyards have played in one degree or another in MARITECH, I would urge the committee to be supportive of MARITECH, I am trying to do some other things that I think will help commercial shipbuilding in the United States.

I am trying to get the coastal Governors interested in some cooperative programs. I am trying to get our cruise lines to buy some American ships. I am going to offer them some possible cooperative work with the United States Navy to help them in ways that would not cost the Navy a lot of money.

Senator LOTT. Mr. Douglass, I apologize for interrupting you, but you have been interrupted all afternoon, so let me take my turn. Have you taken a look at the maritime reform package that is pending at the desk in the Senate? It has already been passed by the House by an overwhelming—well, basically a unanimous voice vote.

Mr. DOUGLASS. I am embarrassed to say I have not, sir, but I will.

Senator LOTT. I wish you would, because I do think it will help address this problem. It specifically has some programs that would be of benefit to the military in case of an emergency, and I hope that you would take a look at it and let us know what your position would be.

Mr. DOUGLASS. Yes, sir. I would be glad to do that.

Senator Lott, I have been to the House and talked to a number of Members. Some of them have individually given me pieces of legislation which I have looked at, but I cannot honestly say I have personally reviewed them.

Senator LOTT. Well, it is pending at the desk, as I say. It has already passed the House, and we can call it up at just about any time, which we may do in the next 6 weeks or so, so it would be helpful if you would take a look at it.

Mr. DOUGLASS. I would be glad to do that, sir, because this is a topic that I have given many speeches on. I go out of my way, even spending my weekends working on this problem.

[The information follows:]

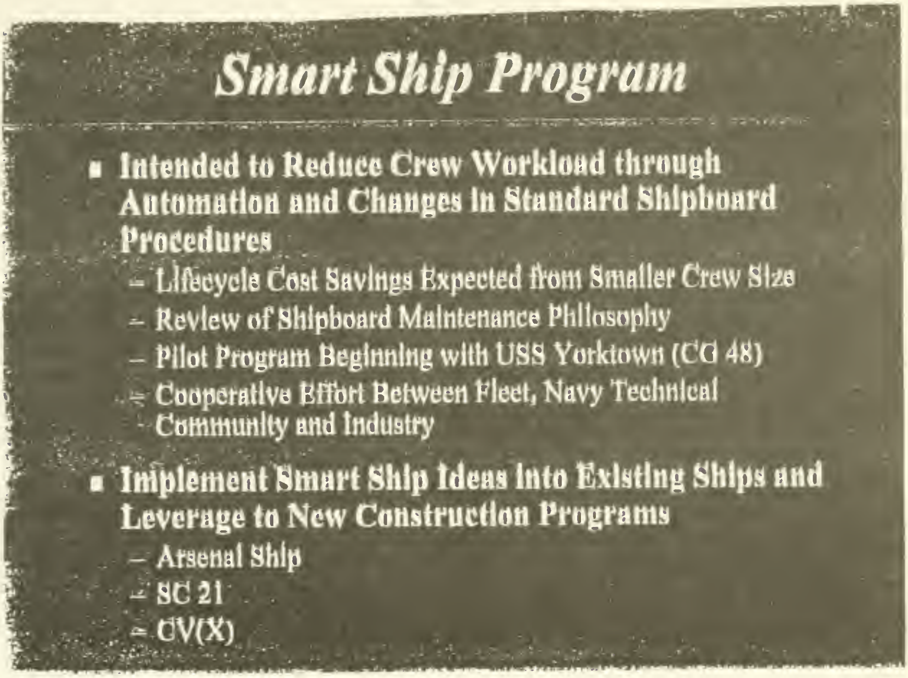
Comments on the Maritime Security Fleet Program pending in Congress will be forwarded in a separate letter.

[The letter was not received at time of printing.]

Senator COHEN. The Chair would like to correct the record. There has not been a series of interruptions, but sort of a rolling dialogue between the Chair and the witness.

Senator LOTT. Very good—rolling dialogue, I like that. I stand corrected, but I just have not participated so far.

Mr. DOUGLASS. Sir, I only have one more chart, and then we can go on to your questions. [Chart 13.]



Smart Ship Program

- Intended to Reduce Crew Workload through Automation and Changes in Standard Shipboard Procedures
  - Lifecycle Cost Savings Expected from Smaller Crew Size
  - Review of Shipboard Maintenance Philosophy
  - Pilot Program Beginning with USS Yorktown (CG 48)
  - Cooperative Effort Between Fleet, Navy Technical Community and Industry
- Implement Smart Ship Ideas into Existing Ships and Leverage to New Construction Programs
  - Arsenal Ship
  - SC 21
  - CV(X)

Mr. DOUGLASS. I wanted to tell you that we have a project called the Smart Ship program.

This is a good example of the innovative nature of our Chief of Naval Operations, Adm. Mike Boorda. I can tell you, sir, that I have served with a lot of senior officers over my years, but Mike Boorda is one of the best. From a personal point of view and from an innovation point of view, I am really blessed to have him as a war-fighter partner in what we are trying to do to revitalize the Navy.

Although this is his initiative, we acquisition people try to take credit for it, too. The idea is to use technology to get crew members off existing ships. I have reviewed some of the technology that we have on these ships, and it is dynamite. We are doing all kinds of things.

You may recall, when I was a staff member here, I was a big advocate of a program called Computer-Assisted Education, where we teach our sailors how to do things using modern computer-assisted techniques.

One of the things that is on this ship is a console that teaches them how to do damage control. If you are a sailor and you do not push the right buttons to turn the right pumps on and off, when you hit a simulated mine, a video comes up, and it is the damage control officer. He talks to you in real sailor talk that you probably could not play anywhere, and tells you, you better turn that pump off.

It is a great training tool for young sailors. It is almost like playing a video game to them. They get on there and do a terrific job.

It is a great thing. It is a good example of the acquisition community and the war-fighters working together.

One of the ways we are going to be able to pay for the modernization in the outyears is getting the operating costs down by getting these modern new ships into the inventory.

Senator LOTT. Do you have a cost estimate on that for the fiscal year?

Mr. DOUGLASS. We do, sir. I do not have it with me, but I would be glad to submit that for the record.

[The information referred to follows:]

The Smart Ship program is considering a number of projects totaling $30 million for fiscal year 1997 that should result in significant life cycle cost savings.

Mr. DOUGLASS. Before you came in, we were talking about the LPD 17 in which we are going to go from some 13,000 operators down to around five, and on the arsenal ship we want to make sure we have a crew somewhere between 20 and 50, and we are really trying to get the personnel side of it under control.

Mr. DOUGLASS. That is all I have, sir. I would be glad to answer any questions the committee has.

[The prepared statement and of Mr. Douglass and Admiral Lopez follows:]

PREPARED STATEMENT BY HON. JOHN W. DOUGLASS AND VICE ADM. T. JOSEPH LOPEZ, USN

Mr. Chairman, distinguished members of the subcommittee, thank you for this opportunity to discuss the Department of the Navy's shipbuilding programs and the fiscal year 1997 budget request. It is an honor and a pleasure to appear before you in this setting among so many people with whom I have worked and for whom I have such high regard.

I am here to provide the committee with the Department of the Navy's plans to modernize and recapitalize the surface fleet, and present our vision and approach for preparing the Navy and Marine Corps for the future. If I may, I would like to address the Navy's long term vision and strategy first, and then describe specifics of current plans and programs for fiscal year 1997.

LONG RANGE VISION

We on the acquisition side of the Navy have developed a long range vision for the future of our Navy-Marine Corps team that, in my judgment, satisfies two overarching objectives:

(1) meets the surface force level requirements needed to maintain readiness by providing our sailors and marines with the best equipment at the most affordable price; and,

(2) protects the Nation's critical maritime industrial base—shipyards, equipment suppliers, and engineering support base—that provides us with the most modern and war-ready Navy and Marine Corps in the world.

To be successful in these two objectives, we must develop affordable and stable shipbuilding programs that will bring together all of the major constituent interests. These include tile Congress, the Department of Defense, the Navy acquisition community, surface fighting forces, and the shipbuilding industry. To make these programs more affordable, we must have a full commitment to establishing and maintaining stability in all shipbuilding programs while investing in long-term affordability initiatives as a key objective in the face of limited budget levels.

TRANSITION TOWARD THE FUTURE

The Navy's surface combatants, amphibious ships, and aircraft carriers are going through a systematic transformation that will ensure that this country maintains modern, capable and efficient forces to meet tomorrow's needs. To facilitate this transition toward the future, the Navy is capitalizing on enabling technologies, acquisition reform, and lessons learned from other successful programs. Only through attention to these items can we accomplish this transformation in an affordable manner.

Today we are proudly building the most modern and capable surface warships ever—the *Arleigh Burke* Class *Aegis* destroyers. These ships are highly capable, multi-mission surface combatants that form the core of today's Navy surface force. Aegis destroyers, together with their sister ships, the *Aegis Ticonderoga* cruiser class, will serve us well into the 21st century. The continued stable production of Aegis destroyers remains a high priority within the Department of the Navy.

We plan to procure the last Aegis destroyer in 2004, thus we have begun early studies and concept designs on a new class of surface combatants, known as the Surface Combatant of the 21st Century—or SC 21. The SC 21, will be the next generation, advanced technology, surface combatant, replacing older ships of the *Spruance* (DD 963) Class, and *Oliver Hazard Perry* (FFG 7) Class. The SC 21 surface combatant will also be designed with an emphasis toward affordability, and low-manning. The ship will be capable of accommodating system upgrades as technology progresses in the future.

Another advanced surface ship representing our transition toward the future is the Arsenal Ship. The design concept is to develop a ship that provides tremendous strike capability—to stop an adversary in the early stages of a conflict. The Arsenal Ship design will also incorporate cost saving, crew reduction initiatives to promote affordability, and be a model for our new approach to a lower cost acquisition process.

In support of the Navy and Marine Corps littoral strategy, "Forward . . . from the sea", we are now embarking on the procurement of a new class of amphibious ship, the *LPD 17* Class. *LPD 17* is a multi-mission amphibious warship that will replace four classes of aging ships in our inventory. The *LPD 17*, as discussed in detail later in this testimony, is an outstanding example—of how we are capitalizing on acquisition reform initiatives to improve the way in which we design, build, acquire, and operate a new ship class. The objective of our acquisition approach is to ensure that the most capable ships are introduced into the fleet while simultaneously ensuring lifecycle affordability.

Our Nation continues to depend on aircraft carriers to respond to world crisis events, so our eleven-carrier (plus one reserve carrier) Navy remains the centerpiece of our forces at-sea. Currently the Navy has five conventionally powered aircraft carriers and seven nuclear powered aircraft carriers. These ships, with embarked airwings, provide the President with a near-instantaneous crisis response capability. We continue to replace our aircraft carriers with nuclear-powered *Nimitz* class nuclear carriers, and this year, we begin early studies and design concepts toward a new advanced carrier called the *CV*(X).

SHIPBUILDING PLAN OVERVIEW

The Navy's shipbuilding plans for fiscal year 1997 include a continued, stabilized procurement of *DDG 51 Aegis* destroyers. We will award contracts in June 1996 for a 2-year, six-ship package, that will include two *DDGs* in fiscal year 1996, and four *DDGs* in fiscal year 1997. This combined six ship procurement package for fiscal years 1996 and 1997 was developed to stabilize the *DDG* program and to meet Congressional direction contained in the fiscal year 1996 Defense Authorization Act.

In addition to requesting four *DDG 515*, we are requesting research and development funds for two new classes of surface combatants, the SC 21 and the new advanced development Arsenal Ship. This effort demonstrates the Navy's intention to invest in future technologies and ship designs to position our surface fleet for the challenges of the next century.

No new construction of aircraft carriers are planned in fiscal year 1997, however, we still need to maintain a fleet of twelve aircraft carriers (11 deployable and 1 training carrier). To meet this need, the Navy is requesting Advance Procurement in fiscal year 1997 for the refueling of U.S.S. *Nimitz* (CVN 68) which is scheduled to begin complex overhaul and refueling in fiscal year 1998.

We also request research and development funds for the next generation aircraft carrier—*CV*(X) in fiscal year 1997. This next generation carrier will be designed to provide the Nation with a modern carrier platform well into the next century.

The Navy will execute the contract award for the first ship in the *LPD 17* Class in June 1996. No *LPD–17*s are planned in fiscal year 1997. We plan on resuming procurement in fiscal year 1998, procuring an additional six ships between fiscal years 1998–2001.

The SCN budget also includes funds in fiscal year 1997 for the conversion of two underway replenishment ammunition ships (AEs) for civilian operation. These ships will be subsequently transferred to the Military Sealift Command. We are also requesting research and development funds for the next generation underway replenishment ship, called *ADC*(X). This new class of ships will be used to shuttle supplies to our forward deployed forces at sea.

Submarines, although not the subject of this testimony, are very much a key element of our overall shipbuilding plan. Our budget includes continued research and development funding for the New Attack Submarine and for incremental procurement funding for SSN 23 in fiscal year 1997.

Our shipbuilding plans from fiscal years 1996 through 2001 call for a shipbuilding rate of approximately three *DDG 51*s per year; one to two *LPD 17*s per year; and auxiliary ship conversions. We are also planning in the Future Years Defense Program (FYDP) to provide Advance Procurement funding for aircraft carrier new construction and refuelings. On average, we are planning to build approximately five new construction ships per year throughout this period.

Key factors used in developing our plans for the future are the number of active ships now in the fleet—approximately 340 ships and submarines today—and their average age. As we right-size the Navy, we have decommissioned a large number of older surface combatants, amphibious ships, and aircraft carriers which has resulted in not only a smaller fleet, but a younger, more capable one.

Nonetheless, the average age of the surface fleet is now in an upward trend, with surface combatants, amphibious ships, and combat logistics force ships all showing increasing average age. This increasing fleet age, and the need to maintain a force of approximately 340 ships and submarines, is the underpinning for the ship construction "Bow Wave" anticipated early in the next century.

Of particular concern is the high average age of our amphibious ships which have high maintenance costs, higher manning levels, and lower reliability compared to ships being built today. The introduction of the *LPD 17* into the fleet is intended to mitigate this problem.

SHIPBUILDING BOW WAVE

The so called "Bow Wave", is the result of our outyear fleet recapitalization requirements and reflects our plans to maintain our current force structure and the OPTEMPO, i.e. quality of life, for our sailors and marines. We also need to continue modernizing our fleet with the latest technology and reduce lifecycle costs. This demands an investment in surface ship technology, and a shipbuilding rate of approximately eight to ten surface ships per year at the turn of the century.

To minimize the Bow Wave, we must maximize our efforts in acquisition reform, while also avoiding program stretch outs and deferrals. Stretch outs and deferrals of new construction programs have major impacts on the Bow Wave and on future SCN budgets, and provide near-term funding reductions at the expense of long-term program cost increases. The result is a requirement for steeper funding increases in the future.

DDG 51 AEGIS DESTROYER

This past year, the Nation's shipyard industrial base successfully delivered to the Navy six *Aegis* destroyers of the *Arleigh Burke DDG 51* class. The *DDG 51 Aegis* destroyer is the most capable multi-mission surface combatant in the world, and the *DDG* program is one of the most successful and important programs in the Navy.

The *DDG 51* class of surface combatants forms the core of the Navy's reduced force structure. These ships, with their multi-mission capabilities, are a force structure multiplier with their ability to operate—and win—in both the littoral and open ocean. The Navy now has 27 Aegis cruisers, IS Aegis destroyers, and 17 new construction destroyers under contract. *Aegis* cruisers and destroyers together represent nearly 50 percent of today's Navy surface combatant force.

In a successful effort to improve upon this already outstanding warship, *DDG 51*s currently under construction represent a modified "Flight IIA" design delivering even more littoral warfare capability and survivability. Our plan is to complete the 57 ship *DDG* program by procuring 25 remaining ships through fiscal year 2004.

The *DDG 51* acquisition approach was developed in response to my concerns—and the concerns expressed by this committee in its fiscal year 1996 Defense Authorization Act—that the stability and viability of the shipbuilding industry are important to the future defense of this Nation. Today the shipbuilding industry is not as healthy as in the past, requiring that we review our acquisition strategies to ensure adequate long-term capability and capacity.

DDG 51 class ships were originally planned to be procured at a rate of five per year. A 45 percent reduction in the procurement rate since the program began has introduced a level of uncertainty regarding the critical surface combatant industrial base. Reduced procurement rates resulted in higher unit costs, lower efficiency, poor overhead planning, and questionable viability of shipbuilders and key subcontractors.

To mitigate the risks associated with industrial base stability, we propose building at a more constant rate of three *DDG 51*s per year. Procurement at this rate will provide stability needed to ensure that industry makes the necessary investment and manages its overhead to reduce Nary program costs. To accomplish this, we are preparing shipbuilding contracts, including options, for combined fiscal years 1996 and 1997 for the procurement of six ships, equally dividing construction between both shipbuilders.

For our long-term strategy for fiscal years 1998 and out, the Navy is investigating the feasibility of a 4-year procurement, with options, for the stable production of approximately 12 total ships, to cover *DDG* shipbuilding requirements in fiscal years 1998 through 2001.

Our *DDG* acquisition approach will provide stability to the currently fragile shipbuilding industrial base, which includes both shipbuilders and the hundreds of suppliers that provide equipment and engineering to support the *DDG* program. If implemented, the long-term acquisition strategy will result in lower costs, reduce disruptions from hiring and laolf cycles, level-load employment, and encourage capital investments; thus improving the performance, efficiency, and viability of the shipbuilding industrial base.

The House Appropriations Defense Subcommittee directed the Department of Defense to report to Congress on the long-range *DDG 51* acquisition strategy, citing the need to introduce more stability into the shipbuilding program and obtain savings from longer term acquisition strategies. I am hopeful that my long-term acquisition approach, as outlined in this testimony, meets the desires and intended direction received from the Congress. A full report on our long range acquisition strategy will be completed in May 1996 and I will provide this committee and other defense committees with a copy of this report.

LPD 17 AMPHIBIOUS TRANSPORT DOCK SHIP

The *LPD 17* Class of amphibious transport dock ships represents the Navy and Marine Corps' future in amphibious warfare, and is one of the cornerstones in our strategic shift known as "Forward . . . from the sea".

The first *LPD 17* will be awarded in June 1996 with follow-on procurements beginning in 1998. Our plan is to procure a total of twelve *LPD 175* to replace forty-one amphibious ships from four classes now in service. This plan will not only modernize our amphibious forces, but will also result in significant manpower—and lifecycle cost—savings by reducing the total fleet manning required for the older amphibious ships that are replaced by the *LPD–17* from currently 13,000 to only 5,200 personnel.

The LPD 17 program represents the Navy's best case of capitalizing on acquisition reform; examples include:

- early industry involvement to solicit ideas on design, production and cost reduction;
- teaming of shipbuilders and combat systems integrators to pool organizational strengths;
- reduction of dependence on Government Furnished Equipment and infonnation—shifting these functions to industry;
- developing a "teaming for life" concept here the winner of the *LPD 17* will have the opportunity to provide the Nary with lifecycle support.
- Eliminating Mil-Specs requirements to only those that are absolutely essential (No Mil-specs if possible).

The shipbuilding industry has given us positive feedback on the *LPD 17* acquisition approach, so we intend to extend the *LPD 17* program model to other new ship class acquisition programs and expect this to yield tangible acquisition and lifecycle cost savings for ships we construct in the future.

AIRCRAFT CARRIER PROGRAMS

For our aircraft carrier programs, we plan to maintain a force of eleven carriers, plus a single reserve training carrier—U.S.S. *John F. Kennedy* (CV 67). The *Kennedy* is designated for training, but she is also capable of responding to a crisis to augment the other active carriers.

As we move toward the next century, the Navy has a need to replace the *Nimitz* Class with a more modern, affordable aircraft carrier design. The next generation of aircraft carrier, the *CV*(X), will be a multi-mission/threat tactical aviation sea-based platform, and is a critical component to maintaining our current force structure. Besides affordability, a key objective for the *CV*(X) program is to capitalize on technology in a clean sheet design to improve core carrier capabilities including ship survivability, joint C^4I, and throughput for current and future aircraft such as F/A–18 E/F, JAST, and the follow-on to JAST:

The key to the success of the *CV*(X) program is acquisition affordability and reduction in lifecycle "ownership" cost. The *CV*(X) carrier program will remain in service throughout the next century. Accordingly, it is critical now to provide adequate research and development investment to save on lifecycle costs in the future.

To better understand the impact on lifecycle cost—and the need to provide adequate investment early in new ship designs—it is helpful to observe that each CV(X) aircraft carrier that this Nation builds is anticipated to have a 50 year service life. Using historical data, we can expect the first *CV*(X) carrier to respond to approximately twenty major crises and possibly three major conflicts; the carrier will conduct over 500,000 aircraft launches and recoveries, spend approximately 6,000 days at sea, and steam a total of three million nautical miles. Over 100,000 men and women will serve over the life of the *CV*(X) carrier. Our great-grandchildren, not yet born, will serve aboard this ship.

ARSENAL SHIP

The Arsenal Ship will be the Navy's pilot program for even further acquisition reform in new ship design and shipbuilding. A new concept ship, capable of maximum firepower, the Arsenal Ship is intended to satisfy joint naval expeditionary force warfighting requirements. Ship design will emphasize minimum crew manning (less than 50 crew members if possible) to save on lifecycle ownership cost, and the design should be straightforward and simple—intended to incorporate approximately 500 vertical launch cells; integrated combat system with cooperative engagement capability; enhanced survivability features; and system upgrade capability.

The initial Arsenal ship is a technology demonstrator for proof-of-concept and will be funded jointly by the Navy and the Defense Advanced Research Agency (DARPA). Our plan is to begin design and construction in fiscal year 1998, and begin sea trials in 2000.

SEALIFT PROGRAM

The 1992 Mobility Requirements Study (MRS) determined a need for an additional five million square feet of sealift roll-on/roll-off (RO/RO) capacity. Our plan is for nineteen Sealift ships to meet this RO/RO requirement. At this time, five conversions and eight new constructions are awarded and six additional new constructions are planned. The Sealift program is based on commercial practices and commercial non-developmental equipment in order to reduce unit costs. We are requesting funds to exercise contract options for two new construction ships, one ship to each contractor.

The Sealift program had a difficult start in the early 1990s. We awarded contracts for seven ships in 1993; five conversions to meet early Army need dates and two new construction contracts. Each new construction contract was for one lead ship and five options. There were some significant delays early in the program, particularly in the conversions. The program now appears to be stable. The first Sealift conversion has been to sea and will deliver by this summer, the second conversion will deliver this fall, and three remaining conversions will deliver in 1997.

COMMERCIAL SHIPBUILDING

Commercial shipbuilding represents an opportunity for the Nation's shipbuilding industrial base to improve its viability and offer the Navy savings. United States shipbuilders are aggressively reentering the commercial markets, which are currently dominated by European and Asian shipyards. Facilitating this reentry are innovative and effective Government programs including the Maritime Administration's Title Loan Guarantee program and DARPA's MARITECH program. The Title program provides foreign and domestic ship buyers with guarantees for purchasing U.S.-built vessels under favorable terms (87.5 percent financing over 25 years). DARPA's MARITECH program provides matching funds to industry engaged in advancing shipbuilding technology.

The Navy benefits from increased commercial shipbuilding activity since additional work is expected to strengthen and help revitalize the industrial base. Marketing and executing commercial work will necessitate an infusion of commercial practices which are expected to improve shipyard efficiency. Increased commercial work will also help to fill gaps in our new construction programs. Finally, from a financial standpoint, such initiatives will spread fixed manufacturing overhead over a greater number of ships reducing Navy costs, and this work, if performed profitably, will provide additional cash flow for shipyard investment in capital assets. Accordingly, we support initiatives underway to promote commercial shipbuilding opportunities.

SMART SHIP

Finally, let me discuss a new initiative, called the Smart Ship. The Smart Ship program is not a new acquisition program; instead it is a program—a team of engineers and fleet operators—established to develop ideas and smarter ways to design and operate ships today and in the future. Smart Ship is intended to dramatically reduce crew workload through automation and changes in standard shipboard procedures. We expect Smart Ship will result in lifecycle cost savings, primarily through reduced maintenance costs and from smaller crew sizes. This initiative requires a top-to-bottom review of current shipboard maintenance and operations philosophy and practice.

To accomplish our objectives, we are engaged in a cooperative effort between the fleet, the Navy technical community, and industry. The Smart Ship program will use U.S.S. *Yorktown* (CG 48) as the pilot ship to implement new ideas, designs, and procedures. Upon developing and testing concepts on *Yorktown,* we plan to apply Smart Ship ideas to ships currently in the fleet and to new construction programs including the Arsenal Ship, SC 21 and the *CV*(X).

CONCLUSION

In summary and conclusion, we believe that the Department of the Navy's request for fiscal year 1997, and our vision and approach for recapitalization in the outyears will meet our two overarching objectives to satisfy surface force level requirements needed by our Navy-Marine Corps team, while simultaneously protecting the Nation's critical and fragile shipbuilding industrial base.

In addition, I urge this committee to look closely at our SCN Bow Wave and support the Navy's requirements for surface ship research and development. These two items are critical to developing and executing our long-term recapitalization plans for the Navy's transition into the 21st century. By working together, we can insure that we provide the sailors and marines of tomorrow's Navy with affordable systems that can meet whatever challenges to our national security which the future may bring.

Senator COHEN. Are you going to give us for the record how much money is in the budget for the Smart Ship?

Mr. DOUGLASS. Yes, sir. It is not a large amount, but we do have that here somewhere.

Senator COHEN. Mr. Secretary, would you go over again why a 1-year gap in the LPD–17 program would not be wise, given the whole history and experience we have had with, I guess virtually every other class of ship that we use the 1-year gap? We have had the DD 963, the LHA A0 177, the TAGOS, the AD 41, CGN 48, MCM 1, MHC 51, they all had no gaps, and they slipped from 1 to 3 years.

Mr. DOUGLASS. Yes, sir. The idea that you will get into trouble if you build a lead ship and then you immediately follow it with another one in less than a couple of years, is probably a sound concept that history has taught us.

What we are simply saying in this particular instance is that if we could move the ship forward, we probably would not accelerate the schedule by a full year. What we would do would be to use the money near the end of the fiscal year. It would help us smooth the transition in our shipbuilding program from the extremely low levels that we are in today, to the more robust levels that we certainly hope we are going to be able to afford in the years ahead.

So by moving the ship forward a year financially, and allowing us to let the contract end fiscal year 1997 instead of the beginning of fiscal year 1998, there would be a fiscal advantage to us. We recognize that if we try to put this contract out too soon, we could get into trouble. The judgment call on that unfortunately, sir, is something that is very difficult to make at this time, because we do not know which team is going to win that contract.

As you know, we are in source selection process now, and there is a decision point in June. We hope to make the award sometime in July or August this year. If we had a dynamite proposal and a dynamite team, and we felt very secure about their design and their costs, we might go a little faster.

If for some reason we looked at what we get in the source selection and we are not as confident, we might have to go a little slower, so there is a judgment call to be made here.

Senator COHEN. We talked about the sealift conversion. How large is the overrun?

Mr. DOUGLASS. When I first came there, it was in the neighborhood of $180 million, and I have been told that it is down in the $130's now. This is a bill we have to pay.

Senator COHEN. By when do we have to pay it?

Mr. DOUGLASS. Fiscal year 1998, sir.

Senator COHEN. Fiscal year 1998?

Mr. DOUGLASS. Yes, sir.

Senator COHEN. You are aware that last year we had in the Senate bill a proposal for split funding on the construction of ships that was designed to level out the construction program.

Mr. DOUGLASS. Yes, sir.

Senator COHEN. Did you have an opinion about the pros or cons to the traditional approach?

Mr. DOUGLASS. Yes, sir, I do. I think it depends on the occasion.

Generally speaking, the full funding policy that the Congress has adapted over the years has been a good policy, because it has put discipline into the system that is badly needed.

When I was a young officer I spent a year at Cornell as a research fellow. I spent a year doing research on previous acquisitions. I wrote a paper that received a lot of publicity in this town in the late 1970's called "Multiyear Procurement, Making It Work for Systems Acquisition".

In writing that rather scholarly piece, I went back and examined many congressional hearings from the 1950's before they had full funding in ships, and we had a lot of problems. We had ships that got started, and then Congress changed its mind and cancelled them half-way through the program, and so on.

It depends on how stable the program is. When you have a program that is stable, and we really know that we are going to be able to afford it because there is consensus in the Department of Defense and consensus on the Hill, then sometimes in order to save money you can afford to split funds a little bit to get yourself over the hump.

But if the thing is controversial and somebody might change their mind it can be dangerous. I would not recommend it in every case, but there are cases when, in my opinion, and not everybody agrees with me, you can do it without a lot of risk.

Senator COHEN. The DDG 51, I assume.

Mr. DOUGLASS. Well, in a way, that is what we are doing now to get six ships in 2 years.

I would prefer, for example, on the DDG's for this committee to tell the Navy that you want me to come back in fiscal year 1998 with a 4-year program for you. Then I could go out and tell you how much I need to get started, and we would just know what it was every year.

We would have three ships the first year, and three the second, and three the third, and so on. We could lay that out in a way that is financially responsible, and allows our shipbuilders to save money, and allows us to save money.

I would rather do it like that than continually be forced into split funding by the exigencies of what we get into in conference sometimes, and at the end of the year, the very last part of the cycle we do not have enough money so we have to do it. I would rather kind of do it in a planned way.

The best example that I can give you is, it was decided to split funds for *Seawolf* last year. The Congress decided to do that, not the Department of Defense or the Navy. You split it into two increments, and we are proposing this year, since you have already split it into two, why not split it into three increments, because once you have decided to split it like that, why not pay the bills when they come in, instead of just putting all the money in? That allows us to smooth our requirements, and we hope that will be helpful to the committee as well.

Senator COHEN. The Senator from Mississippi is checking out the clock, so I will yield to him.

Senator LOTT. I just wanted to make sure the question was asked about the DDG 51, and you asked it.

But also, in addition to split funding for *Seawolf,* I believe we have done that with carriers in the past, have we not, at least one?

Admiral LOPEZ. Sir, we have done advance procurement. We normally do that with carriers, where we put money in 2 or 3 years, and then we do pay in the contract year the larger portion of it, but we do split it out before.

Mr. DOUGLASS. Split funding and advance procurement, though, are different.

Senator LOTT. Well, I think the fact of the matter is we did split funding on that one carrier 2 or 3 years ago, and also we do it on space launch vehicles. I realize there can be some problems with it, and there have been in the past, but I do think there are some ways you could build in protections against that, insurance, if you will, in the program.

I am not sure we want to do it across the board. However, when you look at the bow wave we have got coming out there, I really am wondering how we are going to come up with the ships we need when we face that bow wave out there.

When I look at the numbers, I appreciate what you have and, by the way, we enjoy working with you. We remember when you had a real job back over here.

Mr. DOUGLASS. Thank you, sir, I enjoy working with you as well.

Senator LOTT. But we are very comfortable with you and Admiral Lopez. We appreciate the work that you both do.

When I look at the ships, you have got the four DDG 51's in fiscal year 1997, and one of those is really a roll-over from 1996.

Mr. DOUGLASS. Exactly.

Senator LOTT. So you have only got three, I guess, in 1997, and then you have got a couple of conversions.

Then in 1998 you have around five combatants and a couple of conversions. Now, at that rate that would be about, what, 150-ship Navy instead of 350, is that right? So my question is, while I appreciate what you have here and what you are planning with the destroyers and LPD's, we are going to have a big problem in the out-years providing the ships that we are going to need at the turn of the century. How are we going to address this problem?

Mr. DOUGLASS. Sir, when I first went over there 147 days ago, the people began to brief me on all of this material, and they showed me these charts. The charts that you are referring to are called the "bow wave" charts. I said have you been frank about discussing these things with the Hill, and some of my staff turned green and some of them turned white and they said Mr. Douglass, we are not allowed to talk about this. I said what do you mean, you are not allowed to talk about it? They said, well, we are not allowed to talk about it. We pretend that it is not there. I said this is crazy. We are not going to do this. I talked to Secretary Dalton and said sir, look, I do not know what the policy around here was before, and I certainly do not mean to imply any criticism of the Secretary, but this is something I have got to talk about, and we have got to make realistic plans for this. He wholeheartedly agreed with me, and he said believe me, John, I never put out a policy saying we cannot talk about this.

So we have been much more open in the Navy about trying to figure this out in an open forum, and laying it out. You are absolutely right, Senator, we do have to build more ships if we want to keep our force structure up. Admiral Lopez and I are desperately trying to get this done. I have a hotline in my office that goes to a number of different people. I very seldom call the Secretary on the hotline. I did it once today. But I must call Joe eight or ten times during the day, and he calls me. Basically what Joe and I are doing is trying to do is what you are talking about, figure out how to get over that hump.

Senator LOTT. Take a look at some of the proposals my staff and I and others came up with working with Senator Cohen and Senator Warner, how we can perhaps address this in the future. If we do not start thinking about it now we are going to hit a wall here, and I think our problem is compounded maybe by other events. I have always been very concerned, as you recall, with sealift and airlift and, just a very few years ago we were in the toilet in both areas. Now, we finally have addressed, I guess, the C–17, and it is making good progress, and all of a sudden it may get to be making so much progress it eats up such a chunk of money that, again, we are going to get squeezed on the sealift or the ship side. I am sure you recognize that.

Mr. DOUGLASS. It is interesting that you mention that because I was called to a meeting today by some of your colleagues in the House who were trying to tell me that we ought to do in the Navy as the Air Force did with the C–17, in regard to making the program stable. I wholeheartedly agree, and I am, as I have mentioned on the DDG program, very much interested in trying to address the next 4 years of buys as a block. I think we need to get that program stabilized. I think some of our other shipbuilding programs could be put on that same kind of arrangement. Frankly, sir, some of our Naval aviation programs need to be done that way to save some money.

Senator LOTT. Absolutely. I would like to see you really get involved forcibly in both of those areas. We have lost a lot of time, and we still have a major deficiency in both of those areas. That is one of the reasons why I am concentrating now on the commercial side of this equation, why I have been trying to work through the Commerce Committee and the maritime to make sure that we have a merchant fleet. We are going to have a call on it.

I think this bill is a good bill, and we are taking a pounding in some of the news media as it just being more pork. But, for instance, in the sealift area, while I have a direct hometown interest in a lot of these ship programs, I do not in this particular area. But I am concerned about it because I think we are going to be very exposed if we do not address this problem the next time we have an emergency where we need to get our equipment where it needs to be.

Mr. DOUGLASS. You are absolutely right Senator. As you know, I was a Commander of U.S. Forces in Central Europe before I came on the committee staff. I found that you can go almost anywhere you want to in Europe on a ferry boat. You can go to the Channel Coast, you can go to the Med, go to Africa or to the Middle East or wherever you want to go. You do not have to depend on the road structure there.

Sir, look out into the future, where we are going to go into the next century. We are worried about the ecology and so on, we are going to have to get away from getting in your personal car and driving down I–95 if you want to go from Maine to Florida. So I believe that we need to do something in this country to reinvigorate our coastal shipping trade. I think we need to move a lot more goods along our coasts. It is ecologically sound, it saves energy, it gets these big trucks off the highway that are killing people.

Senator LOTT. You are doing good. Just keep talking.

Mr. DOUGLASS. Sir, I just think there is a big market for us out there. Senator Lott, what it needs in my view is leadership. I am very grateful for the leadership that has been provided by this committee. As a matter of fact, this committee has provided leadership in a large number of areas. Not only your solid approach to the Navy's shipbuilding programs but also acquisition reform issues born in this overall committee and several other very important initiatives which are going to lead us into the future.

I think we need to get out there and do it. You will hear a lot of speeches about this from me. For example, I am trying to get the governors together. I am going to Florida to give some speeches next month, and I am trying to get the cruise lines to buy American. I have pretty much convinced one line and maybe we will get another one. I can envision some ads on TV that say a particular cruise line is working with the United States Navy if legally permissable. I am going to try to go around some of our port cities that maybe interested in getting cruise travel. But the price for that is they have to build their ships in America. So I am doing what I can. I really agree with you.

Senator LOTT. That is good. Keep it up.

Senator COHEN. Would the Senator from Mississippi identify, other than submarines and aircraft carriers, what it is that Ingalls does not have an interest in?

Senator LOTT. Well, I do not think there is anything else. Is oceanography important to the Navy?

Mr. DOUGLASS. Yes, sir. It is.

Senator LOTT. How important?

Mr. DOUGLASS. It is very important, sir.

Senator LOTT. Was it important in Desert Storm?

Mr. DOUGLASS. Yes, sir.

Senator LOTT. Then why is it that we are getting down to having what, our oceanography fleet is going to be down to six ships in fiscal year 1996?

Mr. DOUGLASS. Yes, sir. That is my understanding.

Senator LOTT. I have been told that you need eight.

Mr. DOUGLASS. I was aware that there might be a question on this before I came over here, sir, and I tried to find the answer to that. The best answer that I could get is that the ship that we are considering building in fiscal year 1999 meets the full requirement as the Navy has defined it now, but the money that you put in last year to get us started on that last ship is on hold right now, and I cannot use it. I wish I could make the commitment to you that I could get going on that ship.

Senator LOTT. Well, why do you not look into this and make a case that you should be able to use it? I understand you have got a survey backlog of 240 ship years.

Mr. DOUGLASS. Yes, sir.

Senator LOTT. I believe before anything happened in Desert Storm you had to get oceanography information actually from State-side.

Mr. DOUGLASS. Yes, sir.

Senator LOTT. That came over there about all the currents and everything, and if you have got this tremendous backlog, this is a pretty cheap program, actually, and I understand that TAGS 96—I mean 65—would be the ninth one. You really have a shortfall here.

Mr. DOUGLASS. We owe you an answer for the record, sir, and I will go look and find out where we are and try to tell you where we are going to go.

[The information referred to follows:]

With the acquisition of T–AGS 64, currently programmed for fiscal year 1999, the Navy's modernized oceanographic fleet size would be at the Chief of Naval Operations' and Secretary of the Navy's stated baseline goal of eight ships. Programming for an additional T–AGS 60 ship (T–AGS 65) would result in expansion of the fleet to nine ships, and would require additional support funds and civilian Full Time Equivalents (FTE) to operate it, which are not in the Navy's budget base.

Mr. DOUGLASS. I was there when we launched the *Atlantis*. Ann Bingaman, Senator Bingaman's wife, was the sponsor of that ship. I believe in the oceanography mission. I cannot guarantee you that I can get another one put in the budget, but it is an important thing. It is very closely tied to Navy science and technology.

Senator LOTT. It is sort of an esoteric sort of thing. Most people are not aware of how important it is—until they see what they do. They have no real appreciation or comprehension of what is involved there. I really hope that you will take a look at it and focus on what our needs are there.

Mr. DOUGLASS. Yes, sir.

Senator LOTT. We will look forward to working with you on that and all of these other programs.

Thank you, Mr. Chairman.

Senator COHEN. Thank you very much, Senator Lott.

Admiral Lopez, just a point of clarification—you have been very silent, by the way, just sort of nodding in agreement from time to time. But you said that we had split funding of an aircraft carrier recently, and the question I have is are you referring to the advanced procurement for nuclear materials? Is that what you are referring to as far as split funding is concerned?

Admiral LOPEZ. That is right, sir.

Senator COHEN. You draw the distinction?

Admiral LOPEZ. That is right, sir. Advanced procurement is what I was referring to. I do not recall split funding on a carrier, but we can certainly research that very quickly and get back to you. It is before my watch when we did it. I had heard that we also did that for 1 or 2 years on one of the LHD's, but I need to get back to you and clarify that.

[The information referred to follows:]

The fiscal year 1994 Department of Defense Appropriation Bill provided for an advanced start for CVN 76 with the National Sealift Defense Fund. These funds were never authorized, therefore, advance construction for CVN 76 did not commence. Subsequently, these funds were transferred to SCN in the 1995 Appropriation Bill as well as providing the remaining funds to fully fund the CVN 76 in fiscal year 1995.

Senator LOTT. Yes, we did it on the LHD–6. We split it in two. Plus the last carrier, I believe, we built, and the House went ahead and funded at $1 billion, and then we did $1.2 billion the second year, and then split-funded it over 3 years. Now, maybe that is advanced procurement, but $1 billion is a lot of advanced procurement, sir.

Senator COHEN. Well, we ought to clarify what we have done in the past for the carrier.

Admiral, if you look ahead to fiscal year 1998, do you see some difficulties in building a balanced procurement program?

Admiral LOPEZ. What kind of procurement program, sir?

Senator COHEN. A balanced procurement program. You have a slight upturn in the amount of funding provided, but Senator Lott has been talking about the big bow wave coming.

Admiral LOPEZ. As I look ahead to fiscal year 1998, I do not see it as being too much different, really sir, between fiscal years 1998 and 1997. We are only going to have a few ships in our program. I said before, last year in this forum, that the Navy is small enough already. We need to build more ships. If you are going to have 350 ships, you have to build 10 a year. We do not have enough money to do that right now, and we are balancing our Navy as best we can and building as many ships as we can.

We feel that we do have a good program in the out-years, but that bow wave is out there.

Senator COHEN. We have a great program to cut the budget in the out-years, right? A balanced budget?

Admiral LOPEZ. Yes, sir.

Senator COHEN. All the cuts come in the year 2002. I am just wondering about how we get some of that funding this year and next year, and start to even out the size of that wave that is coming.

Mr. DOUGLASS. Senator Cohen, one observation that I would give you as a relative newcomer over there after 147 days is this—one tradition that the Navy has that I am very proud to be associated with is they offer up budgets they can live with. As you know, that is not always true in all of the services.

Senator COHEN. You can live with it this year and you might live with it next year, but——

Mr. DOUGLASS. What I mean is we do not leave out big blocks that we could not fill if we did not have it. So they really do the best they can. Admiral Lopez is terrific in trying to stretch the dollars in every different direction. He and I meet continually.

Senator COHEN. We are not questioning that. What we are saying is you have to have more dollars.

Mr. DOUGLASS. Yes, sir. We both agree with you.

Senator COHEN. You cannot stretch it any thinner than it is being stretched if you are going to hit the 346 or 350 ships, and if we do not do it this year we say it is like the Red Sox, wait until next year, and then it is wait until next year, and we keep waiting for that pennant, but it never comes.

Mr. DOUGLASS. I was just pointing out that because we try so hard to do a reasonable job with what we have sometimes people say, well, you do not need any more. That is the point I was trying to make.

Senator COHEN. But people will come back and say, Secretary Douglass and Admiral Lopez, that we could live with it.

Admiral LOPEZ. I did not say that, sir. I said that is how much money we have, and we need more ships.

Senator COHEN. Right.

Mr. DOUGLASS. That was my point, too.

Senator COHEN. We have you on the record as saying it twice, though, Admiral. That will be very helpful. [Laughter.]

Senator COHEN. Secretary Douglass, how much funding do you have in this year's budget for the CVX?

Mr. DOUGLASS. As I recall, $6 million in fiscal year 1997.

Senator COHEN. $6 million. Is that, in your judgement, sufficient to allow some meaningful design work?

Mr. DOUGLASS. No. It is just to get the program office started. We could use more money.

Senator COHEN. If I were to ask you, then, now that Senator Warner has come in——

Senator WARNER. I am ready to ask the same question, but go ahead. I would rather the chairman ask it. It shows less bias.

Senator COHEN. When we start talking add-ons, if the committee were to come up with additional funding and you had to list your priorities in terms of how you spend that money, could both you and Admiral Lopez give us some idea of how you would prioritize it?

Mr. DOUGLASS. Yes, sir. Obviously, Joe and I are aware of what is going on on the Hill. We have thought about that, and we are working on the list. I honestly did not bring it with me, but I could tell you more for CVX would be on there.

Senator **COHEN**. If you had a top 10, without holding you to any list of 1 to 10 in terms of the priority, but in your top 10, what would be the items you would be looking at in terms of additional funding, if it is made available?

Senator **WARNER**. May I say I think the CNO has already announced number one is the attack submarine program.

Excuse me, Mr. Chairman.

Mr. **DOUGLASS**. That is right, Senator Warner. That is number one on my list. There is no question about that.

Senator **WARNER**. I did not want you mumbling around here. [Laughter.]

Senator **WARNER**. He set the course and speed on that.

Go ahead.

Mr. **DOUGLASS**. I answered that question that way yesterday and before the House, sir, on the record.

Did you want us to try and do this from memory?

Senator **COHEN**. Just to add a point here, Admiral Boorda's list was for procurement, and we did not know what you wanted for R&D, as well. If we are talking about the new CVX, I put that in the category of the top 10 list that you are talking about. We need to have some notion of procurement R&D.

Mr. **DOUGLASS**. Yes, sir, and we have been working on an RDT&E list, and I just do not happen to have it with me, sir. But I can submit it for the record.

Senator **COHEN**. That will be fine.

[The information referred to follows:]

ADDITIONAL PROCUREMENT RELATED R&D

Program	APPN	TY$M	Notes
CVX	RDTE	52	Accelerate critical catapult technology; fund early industry involvement to address reduced manning and maintenance technologies.
LPD 17	RDTE	8	Address reduced manning technologies beyond current baseline.
SC 21	RDTE	94	Accelerate C^{4}I and Combat System tech and industry involvement in reduced manning and maintenance technologies.
Arsenal Ship ATD	RDTE	141	Accelerate ATD platform to fiscal year 1997.
TBMD	RDTE	140	Inc fiscal year 1997 BMDO R&D for Navy Upper Tier to $200M.
Submarine Advanced Technologies.	RDTE	158	Alt 1 plus adv weps, sensors, hydrodynamics, controls, comms, self-defense, data fusion, sonar processing and EW ($60M).
(Alt 1)		98	Alt 2 plus advanced coatings, propulsor, ejection systems (19M).
(Alt 2)		79	Add $60 core capability advanced tech hydro-dynamics, electric drive, ship control, and solid state electronics. The 19M for adv sonar sensors and processors to enhance first 4 NSSN hulls.
Seawolf Shock Test	RDTE	34	Shock test.
SH–60B/r	RDTE	4.2	The $4.2M to reduce program risk and ensure Critical Design Review schedule compliance.
Total		$631.2	

Senator **COHEN**. Last year, Secretary Douglass, we imposed some limitations on the expenditure of moneys for the National Defense Sealift Fund until DOD came up with a funding of a National Defense Features Program. Where is that?

Mr. **DOUGLASS**. Yes, sir. It is my understanding that $50 million was put in the mark by the committee for this project, but there were some restrictions on it. I personally looked very carefully at that program, and I think it is a great idea. I have gone out of my way and gone to a couple of shipbuilding conferences to try to stimulate interest in that idea.

But the problem with it is that you have got to find a shipbuilder and a ship operator that are interested in being a part of the program. I have been to a couple of conferences where we have gotten the operators and the builders together, and I have challenged them to get involved with us on that program. We are still evolving our strategy, but I solidly support the program.

If we could get this going we could save some money, because we could take some of the standby ships out of the inventory and get a fleet of operating ships with national defense features in them out in the fleet that we could use in times of war. I have forgotten what the savings is. Somebody gave me a figure at one time. It is a substantially large figure, if we could get this thing working in a robust way.

The problem is it works great for the Air Force in CRAF, Civil Reserve Air Fleet, but that is because there are a lot of people flying commercial American carriers who fly big aircraft around the world hauling cargo. We just do not have that same equivalent in the maritime industry.

Senator COHEN. Well, we had testimony this morning from the CINC's indicating that they want the RO/RO's that they can buy right now and not wait till they have this program, and they indicated at a much cheaper level. Now, there has been some dispute about that in terms of whether or not you could take some existing commercial fleets and equip them in a way that we could call upon them in a very short period of time, within 3 or 4 months, and equip them to be of service.

But that is a program that we are interested in, some of the private sector is interested in, I know Bath is interested in that, I am not sure about Ingalls, but I suspect they have got an interest in whatever Bath has got an interest in.

Senator LOTT. We are always trying to help. [Laughter.]

Mr. DOUGLASS. Really, the problem is getting the builders and the operators together so that we can work with them. My commitment to you, sir, is if you ever hear of an operator and a builder team that wants to do this, send them over to see me and I will try to work with them.

Senator COHEN. Admiral Lopez, could you comment on the tradeoff on the destroyer helicopter capabilities, for example, on the 2–A flight of the DDG–51 destroyers? Initially we were going to have an IOC of 1999 I think. They had a tactical towed array that was eliminated, and part of the reason for it was a tradeoff of equipping the helicopters to carry out that mission. Could you tell us what the tradeoffs are and where the programs are?

Admiral LOPEZ. We have a number of helicopter R&D programs. I think you are familiar with our plan to convert most of our SH–60 Band F model ASW helos, to the SH–60R configuration. That is a long-term program that we have funded.

We think we have about the right balance between tails and end, although we are not there yet in ASW-capable helos. If I have a concern, it is that we need to make sure that we do have our decks covered. We are at the margin as far as the numbers of helos available—that is, SH–60's and SH–60R's.

Senator COHEN. Well, as I understand it, this particular helicopter is supposed to perform the antiship mission.

Admiral LOPEZ. That is correct, yes, sir.

Senator COHEN. Do you have sufficient numbers to carry out the—I think it is the LAMPS Mark III block?

Admiral LOPEZ. Yes, sir. We will not have, as in our current budget now, enough helos to cover every spot on every ship. As you know, some ships carry two helos, and I will not have enough helos to cover all those spots. But we will have in the balance, and we have discussed this with our CINC's, enough helos for each battle group.

Senator COHEN. Another question pertaining to the language that we have inserted over the recent years on our authorization bills. We want to encourage the Department to move as quickly as possible to enhance its afloat prepositioning ability, the MPF. Where are we with that?

Mr. DOUGLASS. With the MPF language, as I recall, what Congress really wanted to do was get started with two ships, but we ended up with enough money only to do one. Senator Smith, got engaged with me and asked me if I could not find some innovative way to try to get bids for two, even though we only had enough money in the budget for one.

I worked that pretty hard and came up with a plan in which the people who are bidding on this project can give us a bid for that first ship, for which we have money authorized and appropriated, but also give us an option for a second ship so we could see what the cost advantage would be if we could buy two in the package instead of one.

We are going to open those bids soon, and when we find out what that advantage is, I will be glad to communicate that to the committee. If we figure out in time for you to consider that in your mark, you might find that there is an advantage there and we could get two for not twice the price of one. So I have been as innovative as I could.

As you know, normally you cannot go out on bids unless the money has been authorized or appropriated or there is a clear expectation that it is, so I had to fight the lawyers a little bit on that, but I won. I think we have been as innovative as we could to meet the spirit and intent of the Congress. So as soon as we get those bids I will let you know, and maybe we can get two for a reasonably modest extra amount of money.

Senator COHEN. We have been concerned for quite a few years now about the vulnerability of our surface ships to low-flying supersonic antiship missiles. My understanding is you have a fairly significant multibillion dollar program on for ship self defense. What is the nature of this program? How many dollars are involved? What is the time frame? What are its prospects IOC?

Mr. DOUGLASS. Sir, there are a number of things that are going on in this area of ship self defense, and some of them involve ships just defending themselves by themselves. When they are out totally alone and somebody attacks them, they need certain intrinsic capabilities. We have a program of what we call a multilayered defense that deals with that problem.

Probably the biggest jump forward, though, is in the Cooperative Engagement Capability program, the CEC program. In this program we take all of the sensors that are available on all of the battle force ships and we net that information so we have a really clear air warfare picture that will help us see incoming cruise missiles at very low altitude when they are over the horizon.

We recently did an ACTD called the mountain top demonstration. If you have not seen the results of that I would be glad to come over and brief you. It is very, very dramatic. We put radars on top of a mountain and we shot some cruise missiles at our ships. The radar on top of the mountain passed the radar picture down to the ships and the ships then traded it all around and the computers in the ships figured out who had the best shoot angle. Even though the radars in the ships could not see the cruise missile because it was over the horizon, the ships were able to point to the right spot on the horizon, and as soon as that thing broke the horizon they got a firing solution and got it.

The trick for us is to be able to take that big piece of equipment that is on the mountain and figure out how can we get it small enough so that we can put it in an airplane or an aerostat or something like that.

We have various programs that have to do with ship self-defense. I would say to you though, sir, they need more work, and this is an area that I need to get engaged in. I am not satisfied with the technical progress that we are making in some of these areas, I am going to keep working on it. I think there is an adequate level of funding. It is in the hundreds of millions of dollars that we are devoting to this.

Senator COHEN. Do we have a capability now of knocking down the SN–22, which Iran has?

Admiral LOPEZ. Yes.

Mr. DOUGLASS. Yes, I would say so. You have to be careful what you say in open session. We do have what could be described as a capability.

Senator COHEN. You mentioned this Cooperative Engagement Capability. I have a couple of questions on that. Number one, is the sale of the frequency band, I guess the C band that the CEC operates on, being sold by the administration for commercial purposes?

Mr. DOUGLASS. Sir, that decision is, I believe still under consideration.

Senator COHEN. It has not been resolved yet?

Mr. DOUGLASS. It has not been resolved. I have written to the Secretary of Defense, and the Secretary has written to the Commerce Department, and there is another department involved, it escapes me which one it is right now, but we have asked that they postpone that sale. I do not know whether we are going to get an affirmative answer or not.

If they do not, there is another technical alternative that we have to mitigate the results of the sale. But there are some other technical problems associated with this, some of which, I am sorry to say, I just recently found out about. Frankly, I have got to choose my words carefully here because when I get mad I start saying things I regret, I am not happy that I just found out about some of the technical problems here, and I owe you, the committee, and my boss back in the Pentagon a better look at this program. That is what I am going to go do in the days ahead.

Senator COHEN. One of the questions we had is whether the acceleration of the procurement installment will impact the effectiveness of other Navy command and control links that operate on that frequency range.

Mr. DOUGLASS. Sir, there could be a problem there. I do not want to get into it too much for the record at this stage. I am going to have to go back and take a careful look at this issue. If there are some problems there we will have to do the best we can to resolve them, because CEC has real promise. Joe, I think you would agree with me, that CEC has the biggest technological promise for a solid way of defending the fleet, and it is not that expensive. It is linking assets that we already have together.

There is an explosion in technology going on, as you know, in the electronics we are able to put aboard ships today. We are learning how to fight jointly. We are learning how to use the information that is available in the AWACS airplane and get it down to the fleet so we can see things coming at us a long time before they come over the horizon. When we see them coming, before the people ashore see them coming, we can pass that information to them.

We are learning how to do this, and if there are technical problems with the implementation of this program, we are going to have to go solve them. I am not happy to learn of these issues when I get ready to come to talk to a committee like this that I consider to be our friends and supporters.

Senator COHEN. Well, we will hear more about that later as we progress.

Senator COHEN. A final question—from me, at least, unless Senator Warner is coming back—to both of you is this: We have been dealing with this whole issue of mine countermeasures. It seems that the committee has been the one—you have talked before about the leadership taken by the committee—in many cases forcing DOD or the Navy to change. There is a long list of things we have done. Acquisition reform is one, the purchasing of information technology which came out of the Government Affairs Committee which became part of the DOD authorization bill that the President has signed, Goldwater-Nichols, there is a variety of things that have come out.

One area that we have been less than successful in is pushing the issue of the need for mine countermeasure programs and modernization. Every year the Navy comes up and identifies this as one of the basic problems they confront as far as expeditionary forces hitting the beaches, and every year they say we are going to do something about it, and it gets pushed off year, after year, after year.

I was just wondering, what do you think needs to be done by the committee? What are the two of you doing from within the building, as such, to change this attitude, everybody wants it but no one wants to pay for it?

Mr. DOUGLASS. First of all, sir, I can tell you that under your subcommittee's leadership you all did something that forced us to hold our feet to the fire last year. It made it a little uncomfortable but, in my judgment, you did the right thing. Basically what you said was that the Secretary has to certify that we have fully funded our plan or bad things are going to happen to us.

When I got over there, I asked to see this and asked for the status. What I found out was that they were going to equivocate again. They were going to send a plan with now you see it, now you don't, the money is in there but it is really not in there, and so on.

Basically, I sent the plan back two or three times. I got my lawyers involved and I got my lawyers to explain to the people what happens when you certify to the Congress information that is not correct. Son of a gun, we started finding the money, and we found all of the money in the current fiscal year.

I cannot promise you the money in the outyears, sir, because we have a process and it is called the POM process. Joe and I are working that now. We sent to the Secretary of Defense a letter which says, we found all the money for the near time near years and we promise to put it in there in the out years, please make this certification to the Congress. We are hopeful that they will make that certification.

It was a painful process to go through but it is, frankly, due to the leadership of this committee the plan is going to get fully funded. We would not be happy if you did that to us on everything because we would not have any management flexibility to make trade offs.

But in this particular area, I am determined, Senator, to comply with the law when you issue us a law. Sometimes I have to get a 2 x 4 out over there and walk around and whack a few people to get them to do it. But we have done it in this case and I feel comfortable that that plan is moving along. I understand there was a hearing concerning the plan, and General Jones was the witness the other day.

Senator COHEN. Yes.

Mr. DOUGLASS. I cannot think of a finer officer to be running this effort than him and with the help of Joe, we will get this one solved.

Senator COHEN. He gave a very fine presentation and I think he has been doing outstanding work in trying to really put some focus on this and deal with the problem confronting the Marine Corps and the Navy.

The only point I made to him was you've got funding this year but there is nothing in the outyear plan and he will not be there next year. Neither will I be here next year. So, you have the issue of personnel turbulence and program stability. We have the same people coming up who are going to need the same kind of dedicated effort. Unless we have people who are there pushing them constantly and unless the push comes pretty consistently or persistently, it does not happen.

Mr. DOUGLASS. Yes, sir, we got your message and I have given it the best shot I can. I am somewhat unpopular in some circles because of what I have done to meet this committee's direction.

Senator COHEN. Senator Warner would say that means you are doing something right because he shares the same unenviable position of being unpopular in some cases. [Laughter.]

Senator WARNER. Well, despite that, Mr. Chairman, I intend to be back here next year.

Senator COHEN. As a matter of fact, I might say I intend to help you get back here if I can.

Senator WARNER. That you have done already. But I would say, since you have raised that, Mr. Chairman, we have served together side-by-side, this fine Senator and I, side-by-side for 18 years, and when I was ranking on this committee some 6 years, he assumed the chairmanship of the seapower committee or the ranking at that time. When I came back and Senator Thurmond took charge of the committee, I decided to stay there even though I had the seniority.

Senator COHEN. Of one day.

Senator WARNER. Yes, of one day. But anyway, next year, you will be looking at me as chairman, hopefully, of this subcommittee and I intend to change to this subcommittee as the chairman and continue his fine work and I will take the heart of the record as he has established it.

Mr. DOUGLASS. When I retired from the military, sir, I had to make a choice as to what State I would transfer my residency to. I, like so many soldiers, volunteered to come into the military in the early 1960's. In the military you could take your home State with you, that was the great State of Florida, and I love Florida. It is my family home.

When retired I had to pick a place to transfer my residency to and I picked the great State of Virginia.

Senator WARNER. Thank you. I just want to say what a fine record Chairman Cohen, and prior to that ranking Member Cohen, has done on this subcommittee. I will carry forward in the years to come the foundation you have laid, particularly in the shipbuilding area.

Mr. Chairman, you have covered one of my major concerns and that related to Secretary Dalton saying that he talked about the shipbuilding schedule here and the low procurement rate of ships because the fleet is young, I am not sure what he meant by that, but anyway, that is his selection of words. I think we should be buying more ships now as does the chairman, and you have done a lot, Mr. Chairman, to do that as possible.

I do want to know, Admiral Lopez and Mr. Secretary, how well the Navy is faring under the law. As you mentioned last year, Mr. Secretary, about trying to save money through the acquisition process and hopefully that money could be generated for future shipbuilding budgets. How is that coming along?

Mr. DOUGLASS. It is coming along well, sir. I have spent a lot of time on that. Unfortunately, we do not have my acquisition reform charts here today. But I had a hearing yesterday in the House Appropriations Committee (HAC) where I went over that in some detail. We have an excellent program in the Navy. I have already been able to document about $20 billion in savings through acquisition reform. I wish I could take credit for all of it but I cannot. Some of it I can. I am spending a lot of time on acquisition reform.

Senator WARNER. It looks as if it is going to generate some money. That is what I want to say.

Mr. DOUGLASS. It is going to generate some money yes, sir. Some people overestimate what it will do but it will generate money.

Senator WARNER. Admiral Lopez, what are your views on it?

Admiral LOPEZ. We have to continue to execute the BRAC process, sir, from our perspective, in addition to acquisition reform. That process has been slower than we like, as I mentioned last year with our environmental concerns, slow in the sense that we have not been able to close the bases in some of the areas as fast as we would have liked. So, we are not seeing the returns of money that we would like. There is some but not as we had anticipated in the early years when we first did BRAC.

If I may be so bold, I would like to comment just on one thing that you said about the Navy being "young". The reason Secretary Dalton said that is that we have taken 40 percent of our force structure out, across-the-board. This is more than any other service. Therefore, none of our old ships are left and that is why our force is younger, if you look at it, than some of the other services because we took the bite, a big bite, up front so that we could recapitalize our force for the future.

Senator WARNER. Well, we experienced the same thing when I was there. We went from about 980 ships in 1970 down to just about 550 in 1974.

Admiral LOPEZ. Yes, sir.

Senator WARNER. So, I know what happens.

Admiral LOPEZ. Yes, sir.

Senator WARNER. Let me turn, then, to my last question, Mr. Chairman.

The Defense Authorization Appropriations bill provided for funds for R&D for the submarine of 100 million. In general terms, what are your plans for these funds and what is the current status of the effort.

Mr. DOUGLASS. Sir, the fiscal year 1996 moneys that were given to us for the submarine program are being used exactly as intended in the act. I have been very, very scrupulous in working that.

Senator WARNER. That would be a part of the statements that would be made by Naval persons tomorrow; is that it, as we go through that?

Mr. DOUGLASS. Yes, sir.

Senator WARNER. They will address in some specificity that issue?

Mr. DOUGLASS. Probably not tomorrow but they would on Tuesday when we announce the plan if we continue on the current schedule. The ceremony tomorrow would be a ceremony to sign the document which sets up the competition. It would not get into how we are going to spend the money in fiscal year 1996. I have a good story to tell and I would be glad to give it to you or submit it for the record.

When we finally lay out this plan, I certainly anticipate going through the whole thing from A to Z with you. I think you will be pleased to see that we have followed the intent of the Congress in 1996.

Senator WARNER. Fine. Thank you. I would appreciate it if before you depart today, would you call your office and see if you can determine whether or not tomorrow is still on?

Mr. DOUGLASS. Yes, sir.

Senator WARNER. I have a very heavy schedule and I need to make some adjustments if that is the case.

I thank you, Mr. Chairman, and thank you again for all you have done for the Navy.

Senator COHEN. Thank you, Senator Warner, and not withstanding the fact that he has only 1-day seniority he has many years of seniority and wisdom in the service of the Navy and it has been really my particular pleasure to have worked with Senator Warner. Like you, Mr. Secretary, I will be out there helping if I can, or staying away, if that will help.I may do one or the other.

Mr. DOUGLASS. We need you, sir. Hang in there.

Senator COHEN. We need him to come back here next year and I want to thank both of you gentlemen for appearing here today.

Senator WARNER. My devotion to the Navy is very simple. I would not be in this seat were it not for what the Navy did for me as a young person.

Thank you very much.

Senator COHEN. We are adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR WILLIAM S. COHEN

SHIP SELF DEFENSE

Senator COHEN. As you know, this committee has been concerned for several years with the vulnerability of U.S. Navy surface ships to the threat of supersonic, low-flying anti-ship missiles.

The Navy has proposed a multi-year, multi-billion dollar program to develop an effective ship self defense capability.

Would you summarize for the committee the principal elements of that program, the dollars required and the time-frame required to deploy the systems?

Mr. DOUGLASS. The Navy's ship self defense effort is a balanced initiative consisting of three major elements: procurement/upgrade of selected existing systems, integration/automation of these systems, and leverage of existing and near-term technologies to provide a robust next-generation capability for the Fleet.

The fiscal year 1997 budget request for ship self defense efforts (excluding Cooperative Engagement Capability) is $189M RDT&E, $128M OPN and $86M WPN.

Many existing and upgraded systems have already been deployed. The first fully integrated/automated combat suite, employing the Ship Self Defense System MK–1, will achieve Initial Operational Capability (IOC) in U.S.S. *Ashland* (LSD 48) later this year. A significant development closely related to ship self defense, called Cooperative Engagement Capability, will also achieve IOC this year.

Senator COHEN. Are you confident that the program proposed is cost-effective?

Mr. DOUGLASS. Yes. The Navy has used a performance-based investment strategy, conducted by ship class, to identify the highest payoff elements. Additionally, the Navy is maximizing the use of Commercial Off-The-Shelf (COTS) and Non-Developmental Items (NDI) to minimize development time as well as cost. For example, the Ship Self Defense System MK–1 is approximately 40 percent. COTS/NDI, and Cooperative Engagement Capability is nearly 60 percent COTS/NDI.

Senator COHEN. How would you respond to those who would describe your program as "a typical Navy R&D program; 7–10 years and billions of dollars?"

Mr. DOUGLASS. Navy deliberately structured a unique development strategy to deploy essential capability early and to include the ability for successive improvements as technology permits and the threat demands. The OUTLAW BANDIT system which reduces a ship's radar signature has been installed in most FFG 7 class ships and in many destroyers and *Aegis* cruisers. All *Aegis* destroyers are now delivered with OUTLAW BANDIT capability installed. In addition, the Rapid Anti-Ship Missile Integrated Defense System ship defense decision aid is in production and will be installed in six destroyers this year.

The cornerstone for our active ship defense is the Ship Self Defense System MK 1, which will be operational this year, only 3½ years after the proof-of-concept tests in 1993.

Senator COHEN. Because the anti-ship missile threat is so serious, is there anything we in the Congress can do to shorten the time-frame for fielding effective systems?

Mr. DOUGLASS. Much of the ship self defense development and fielding is being paced by available funding. Continued Congressional support, particularly in maintaining program stability, would be most helpful.

Senator COHEN. When will the first significant Ship Self Defense upgrade reach the Fleet? Please provide a list of Ship Self Defense upgrades that are programmed and the year in which they will be operational.

Admiral LOPEZ. There have already been several significant Ship Self Defense upgrades introduced to the fleet since the establishment of PEO(TAD). Outlaw Bandit is a shipboard radar cross-section signature reduction upgrade. By applying radar absorbent material to selected areas of a ship's superstructure. the ship's radar cross-section is drastically reduced, thereby enhancing the ship's survivability against anti-ship cruise missiles when used in conjunction with the AN/SLQ–32 and decoys. Outlaw Bandit is installed in 51 *Spruance, Oliver Hazard Perry,* and *Aegis* Cruiser ship classes. Another 16 ships are planned for installation by the end of fiscal year 1997. The Rapid Anti-Ship Cruise Missile Integrated Defense System (RAIDS) is a tactical decision aid for the Commanding Officer/Tactical Action Officer that provides automatic display of anti-ship cruise missile threats, integration of active and passive sensors displays and recommends action to be taken by existing terminal defense systems. Fleet introduction commenced in 1995 for *Spruance* (DD 963) Class Destroyers. By the end of fiscal year 1996, RAIDS is programmed to be installed in 18 *Spruance* Class ships. Fleet introduction for the *Oliver Hazard Perry* (FFG 7) Class ships will begin in fiscal year 1997. The Rolling Airframe Missile (RAM) Block 0 is another Ship Self Defense upgrade that is now installed in all the LHA ships and is programmed for all other amphibious ships. RAM is a quick reaction, "fire and forget" missile that complements other Self Defense weapon systems. Since achieving Initial Operational Capability (IOC) in June 1993, RAM has achieved a perfect firing record, 26 of 26. The Phalanx Close-In Weapon System (CIWS) has evolved over the years via upgrades. The latest Fleet CIWS configuration is the Block I. This upgraded configuration includes a larger magazine (1,500 rounds), a multiple pulse repetition frequency search radar, an expanded radar search envelope to counter diving threats and a pneumatic gun drive system that increased the rate of fire to 4,500 rounds per minute.

The Ship Self Defense System (SSDS) will be the next significant upgrade to reach the Fleet and will make the largest contribution to ship self defense.

SSDS comprises the necessary equipment and computer programs to integrate all of the ship's sensors and weapon systems into an integrated combat system. SSDS integrates and automates multiple sensors and multiple self defense weapons on a ship class basis (non-AEGIS) to provide a Quick Reaction Combat Capability (QRCC) that coordinates employment of hard-kill and electronic warfare assets to defeat anti-ship cruise missiles. SSDS is in the engineering and manufacturing development phase. Installation on U.S.S. *Ashland* (LSD 48) is scheduled for mid-1996 followed by Developmental and Operational Testing in late 1996. Fleet introduction is scheduled for mid-fiscal year 1997. SSDS will be installed on non-*Aegis* class ships. i.e.. LSD–41, LHD–1. LHA–1, CVN, and LPD–17 ship classes.

Another major Ship Self Defense upgrade will be the introduction of the Advanced Combat Direction System (ACDS) Block I. When SSDS is networked to ACDS, the QRCC is integrated into the Battle Force. ACDS provides for the integration of the Cooperative Engagement Capability (CEC) and JTIDS Model 5 into the non-*Aegis* Fleet. ACDS is a centralized, automated command and combat direction system that collects and correlates combat information for display. It communicates command and control information to ownship combat system components as well as ships throughout the Battle Group. It provides the primary real-time command support in AntiAir Warfare, Anti-Submarine Warfare, Anti-Surface Warfare, Electronic Warfare, and Naval Surface Fire Support/Strike such that efficient, multi-mission combat actions are coordinated in response to threats to the Battle Group. ACDS is scheduled for Developmental and Operational Testing in fiscal year 1997. Fleet introduction is anticipated in mid-1998.

These and other improvements are planned Ship Self Defense upgrades which are programmed over the next several years. The order of Fleet introduction is summarized as follows:

ORCC elements	IOC
SSDS	Fiscal year 1997
CIWS BLK1A	Fiscal year 1997
TISS	Fiscal year 1997
ACDS	Fiscal year 1998
CIWS BLK IB	Fiscal year 1998
NULKA	Fiscal year 1998
RAM BLK I	Fiscal year 1999
AN/SPQ–9B	Fiscal year 1999
ESSM	fiscal year 2000
IRST	Fiscal year 2001
AIEWS	Fiscal year 2001

STRATEGIC SEALIFT

Senator COHEN. Mr. Douglass, the Navy's program to build or convert large medium speed roll-on/roll-off ships is well behind schedule. We are informed that the delays have finally begun to impact on scheduled rotation of Army pre-positioned equipment. Please summarize why these delays occurred, what has or could be done about them, and what cost growth, if any, will occur that may required additional funding?

Mr. DOUGLASS. The majority of the delays and all of the cost overruns have occurred on the sealift conversion contracts. These contracts were awarded in July 1993 with three ships to National Steel and Shipbuilding (NASSCO) in San Diego and two to Newport News Shipbuilding (NNS) in Newport News, Virginia. The original conversion contracts had an eighteen month delivery schedule. Contract deliveries have been extended 15–22 months with both government and contractor responsibility.

The government was responsible for an initial schedule delay of approximately 7 months for two primary causes. First, the U.S. Coast Guard revised and significantly increased the fire fighting system requirements to account for the hazardous cargo load. Second, the government furnished class standard equipment detail design information was delivered later than required by the shipyards. This was caused by accelerating the ship contract awards to support Army and JCS required delivery dates as well as strong interest in getting work into the industrial base.

The 8–15 months contractor responsible delays resulted from underestimating the complexity and difficulty of the design and production effort, inefficient production, and a slow start up at both Newport News and NASSCO. NASSCO production inefficiencies were predominately driven by work arounds due to parts shortages and inefficiencies in steel ripout, modification work, and steel fabrication and assembly. NNS had similar production inefficiencies as well as additional significant detail design and production challenges involving strengthening of the double bottoms and stern structures which NNS did not anticipate. These delays are reflected by the increased cost on the contract shorelines and are the cause of the cost growth.

The new construction ships have incurred delays of approximately four to ten months. This was caused by the late delivery of government information for the class standard equipment and to allow the shipbuilders flexibility to align their production schedules for greater production efficiency. There has been no cost growth in new construction.

The Navy and the contractors have worked diligently to resolve all issues and the first conversion ship will deliver later this spring. We are working with the Army to minimize the impact of the late deliveries and believe that with some adjustments we will be able to accommodate their requirements.

Total cost growth of $131 million has occurred because of the conversion program. This is being included in our current budget development process and will be included in a future budget submission, most likely fiscal year 1998. The funds are not required at this time to maintain full progress in the program.

FORCE LEVELS (SHIPS)

Senator COHEN. Admiral Lopez, the two MRC requirements has been the driver for our military force levels, and naval forces have been in high demand throughout the world, for both presence and contingency operations. With the ongoing review of force level requirements, can you address key developments over the last year related to the appropriate sizing of our surface combatant ship force, and the contribution the proposed fiscal year 1997 DDG–51 budget request and acquisition plan will make to the fleet's war fighting readiness?

Admiral LOPEZ. While the requirement to fight and win two nearly simultaneous Major Regional Conflicts (MRCs) is a significant aspect of surface combatant force level planning, I must also emphasize that the National Security Strategy. National Military Strategy, and Defense Planning Guidance all specify peacetime forward engagement requirements as equal with MRC requirements. in determining naval force size. This is in support of the administration's "Engagement and Enlargement" national security theme and reflects unanimous CRNC requirements attesting to the unique flexibility, deterrence value, and warfighting leverage provided by on-scene CVBGs. Thus, maintaining forward engagement and deterrence requirements is really the driving factor in naval force size determination.

Naval force structure continues toward the long-term goal of a 330–346 ship force. This force has been tailored to support peace-time forward presence as well as to support the ability to fight and win two nearly simultaneous major regional conflicts. Within fiscal constraints, the current planned force, validated by the Bottom-up Review, supports this strategy. There is no plan to alter this force barring any radical change to the world geopolitical environment and corresponding U.S. strategy.

The proposed fiscal year 1997 DDG–51 budget request and acquisition plan allows the Surface Navy to improve on its core number of unrestricted multi-mission surface combatants.

Some of the additional developments in the past year include:

- Arsenal Ship Program Proposal Development.
- Planned funding of RDT&E for the SC–21 family of future surface combatants.

SS–N–22/C802

Senator COHEN. Does the Navy currently possess an effective capability against already deployed anti-ship missiles such as the SSN–22 and the C802 which I understand are presently deployed in Iran? If the answer is no, when do you anticipate having that capability?

Admiral LOPEZ. [Deleted].

Mr. DOUGLASS. [Witness did not respond in time for printing. When received, answer will be retained in committee files.]

Senator COHEN. Mr. Secretary/Admiral Lopez, when will the first significant ship self-defense upgrade reach the fleet? please provide a list of ship self defense upgrades that are programmed and the year in which they will be operational.

Admiral LOPEZ. [Witness did not respond in time for printing. When received, answer will be retained in committee files.]

Mr. DOUGLASS. [Witness did not respond in time for printing. When received, answer will be retained in committee files.]

FORCE LEVELS/HELICOPTERS

Senator COHEN. Admiral Lopez, the Navy has also been reviewing its overall helicopter force level requirements, with a clear need to replace the aging Vertical Replenishment Helicopter (the CH–46) which has been performing the bulk of underway vertical replenishment for our deployed battle groups. I have read in the trade press that the Navy is looking at its options to replace this helicopter.

Can you discuss the modernization plan that you envision for Navy helicopters for the surface combatant forces, logistic forces as well as those helicopters that perform air station duties such as search and rescue?

Admiral LOPEZ. The helo master plan envisions a neckdown of Navy helo Type/Model/Series from six to two. All the SH–6OBs, SH–6OFs. and HH–60s will be converted to the SH–60R. The CH–46 will be replaced with the CH–60. The decision has not yet been made as to the future of Air Station helicopters.

Senator COHEN. In regard to the specific question of replacing the CH–46, I have also read that the Navy is eyeing a modification of the Army's Black Hawk helicopter. How compelling is the need to replace the CH–46, and when would you have to start such a program?

Admiral LOPEZ. The Navy is currently short of inventory requirements by 19 aircraft. The existing H–46 airframe is becoming increasingly difficult to maintain, and maintenance man-hours per flight hour is increasing. We are currently scheduled to start in fiscal year 1998.

Senator COHEN. Does it save dollars by making modest modifications to an existing helicopter such as the Army's Black Hawk helicopter to meet the Navy's need for such helicopters?

Admiral LOPEZ. Yes it would. The Navy is interested in procuring the CH–60, which will be a Black Hawk body with Navy dynamic components (i.e. rotorhead and tailrotor, which allows for folding onboard Navy ships). The CH–60 will be common to the rest of the SH–60 SeaHawk fleet except for the Black Hawk body which will provide a better logistics and SAR platform. Using, the CH–60, the HC Cost and Operatioml Effectiveness Analysis (COEA) estimated life cycle savings to be approximately $650 million.

ADDITIONAL PROCUREMENT FUNDING

Senator COHEN. Mr. Douglass and Admiral Lopez, at this year's DOD posture hearing, Secretary Perry observed that procurement funding added last year by Congress had been generally helpful because it had been for the most part applied to weapons systems that were already included in DOD's Future Years Defense Program. If additional funding becomes available this year, which DON development or acquisition programs do consider the best candidates for an additional increment? Are there any that would not be good candidates because of phasing considerations such as "new starts?"

Admiral LOPEZ. The best candidates for increased fiscal year 1997 funding are those development and acquisition programs that would speed recapitalization of our Navy through funding of already approved programs.

The table below summarizes these priorities:

Program	FY 1997 TY$M	Notes
New SSN AP (NSSN)	504	Funds nucl/non-nucl AP for fiscal year 1999 NSSN (fiscal year 1999 authorized in fiscal year 1996 Auth Bill).
LPD–17 ship	835	Procures the 2nd ship of the class in fiscal year 1997.
DDG–51 (3 DDGs-fiscal year 1998).	750	Establishes stable production rate @ 3 ships/yr by funding in fiscal year 1997 for 3 fiscal year 1998 ships.
CVN–77	1,057	Adv proc. for CVN–77; additional funds required to procure CVN–77 ($4,305M in fiscal year 1997).
F/A–18C (6 a/c)	185	Restores last 6 of 24 a/c lost due to affordability; Senate fiscal year 1996 action funded 24 a/c; Conference and final APPN Act bought 18. Will replace older F/A–18s.
CEC (accel jnt effort)	55	Provides funding to accelerate CEC integration on joint systems (AWACS/Patriot/THAAD/Hawk).
Restore AV–8B (10 to 12)	68	Restores 2 a/c lost due to affordability.
Restore E–2C (2 to 4)	155	Restores 2 a/c lost due to affordability.
EA–6B:		Inserts high-priority programs for critical national missions.
Band 9/10 jammer	40	Fiscal year 1996 APPN Act provides 60; request buys 60 sets.
USQ 113 (comm jammer)	75	Fiscal year 1996 APPN Act provides 30; request buys remaining 90 sets.
Turbine engine blade containment.	40	Procures Turbine Engine Blade Containment System 120 a/c (reliability mod).
Center wing sections	50	Procures 10 center wing sections for replacement (safety/reliability mod).
EA–6B total	205	
TLAM:		
Procurement	32	Incr qty (113 to 157; max contract qty) for Surf Blk 111C; incr total inv fiscal year 1999 to 2851 (shipfill=5849).
Recert/Remain	55	Recerts all (334 msls, Surf/Sub 11 Cs) due fiscal year 1997 (incr of 230); also reman 45 Blk IIC–IIIC (approx Ind Cap).
Total	87	
JSOW (baseline)	71	Incr (+200) qty to 300 in fiscal year 1997 (max LRIP); IOC:fiscal year 1998.
SCN (SSN–23)	105	Restore funding deferred due to affordability.
CVX	52	Accelerate critical catapult technology; fund early industry involvement to address reduced manning and maint tech.
Total	4,412	

None of these programs are new starts. All are good candidates for additional funding and can phase in increased fiscal year 1997 funds without disruption. New SSN AP, LPD–17, DDG–51, CVN–77 AP, SSN–23 and CVX are the shipbuilding priorities here

ADEQUACY OF BUR 346–SHIP NUMBER

Senator COHEN. Admiral Lopez, given the Navy's recent experience in number of operations other than war, is the Bottom-Up Review number of 346 ships an accurate statement of your requirement to adequately support future "presence" and warfighting missions?

Admiral LOPEZ. Assessments and programming divisions subsequent to the Bottom-Up Review have modified the force to be about 330–346 ships through fiscal year 2001 which is sufficient to fulfill 2-MRC warfighting requirements and address overseas presence requirements. The BUR recognizes that we cannot achieve *continuous* presence, as desired by the regional CINCs, with this force size. .We minimize the resulting risk by exploiting a major strength of naval forces—*mobility*. Mobility allows us to respond to emerging crises by shifting assets from one region to another. Periodic or episodic employment of joint forces can also fill some gaps in naval presence, although not necessarily with the same basket of capability and flexibility.

Today we have 362 ships in the Navy inventory, down from 526 in fiscal year 1991, the year of DESERT STORM. The Chief of Naval Operations approved 46 exceptions to his PERSTEMPO policy in 1992, reacting to scheduling perturbations caused by the Gulf War. Since 1993 the CNO has approved only 26 PERSTEMPO exceptions. About half of these (an average of roughly four per year) were due to operations other than war, in Haiti and other places. The rest were because of mechanical casualties, storm evasion, a collision leading to a speed limitation, and scheduling anomalies.

The Navy continues to downsize to the BUR level. We can meet our deployment length and PERSTEMPO guidelines at this level, with few exceptions, provided requirements placed on us don't increase dramatically.

[Whereupon, at 3:47 p.m., the hearing was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1997 AND THE FUTURE YEARS DEFENSE PROGRAM

TUESDAY, MARCH 26, 1996

U.S. SENATE,
SUBCOMMITTEE ON SEAPOWER,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

DEPARTMENT OF THE NAVY'S MARINE CORPS PROGRAMS

The subcommittee met, pursuant to notice, at 2:38 p.m. in room SR–232A, Russell Senate Office Building, Senator William S. Cohen (chairman of the subcommittee) presiding.

Committee members present: Senators Warner, Cohen, Smith, Robb and Lieberman.

Professional staff members present: Steven C. Saulnier.

Minority staff members present: Arnold L. Punaro, minority staff director; Creighton Greene, professional staff member.

Staff assistants present: Patricia L. Banks.

Committee members' assistants present: Dale F. Gerry, assistant to Senator Cohen; Thomas L. Lankford, assistant to Senator Smith; Andrew W. Johnson, assistant to Senator Exon; Steven A. Wolfe, assistant to Senator Kennedy; John P. Stevens, assistant to Senator Glenn; William Owens, assistant to Senator Robb.

Committee members' fellows present: CMR Michael J. Matthes, fellow to Senator Warner; CDR Thomas A. Vecchiolla, fellow to Senator Cohen; Craig B. Williams, fellow to Senator McCain; Thurston E. Womble, fellow to Senator Lott; Randy O'Connor, fellow to Senator Kennedy; LTC Michael W. DeYoung, fellow to Senator Bryan; and Stan Kauffman, fellow to Senator Lieberman.

OPENING STATEMENT OF SENATOR WILLIAM S. COHEN

Senator COHEN. This afternoon, the Senate Armed Services Subcommittee on Seapower meets to review Marine Corps Programs contained in the Department of Navy's Defense Authorization Request for Fiscal Year 1997.

Today, we will concentrate on Marine Corps modernization and future readiness. The Readiness Subcommittee, chaired by Senator McCain, has already conducted a very thorough evaluation of current readiness.

Our two witnesses are the Honorable John W. Douglass, assistant Secretary of the Navy for Research, Development and Acquisition; and Gen. Charles Krulak, Commandant of the Marine Corps. General Krulak, in testimony before the full committee during the Department of Navy's posture hearing and later before the Readiness Subcommittee, has already made his concerns about future readiness clear.

General Krulak, I believe you clearly expressed your concern when you told Senator McCain's subcommittee that your greatest challenge as Commandant would be to ensure the Marine Corps remains as ready in the future as you judge it to be today.

We are going to take those thoughts as a point of departure for this hearing. It has been customary in the past few years for the Commandant to appear before the subcommittee alone to ensure that we receive a clear, articulation of his views and priorities.

This year, we also invited Mr. Douglass to testify because as a Department Senior Acquisition Executive, he bears the principal responsibility for developing and buying the equipment the Commandant needs in the best manner possible.

We need to satisfy ourselves that Mr. Douglass understands the Commandant's priorities—I am sure there has been some discussion of this between the two of you—but understands the Commandant's priorities and is moving as quickly and efficiently as possible to satisfy them.

General Krulak, we know from your prior testimony the Department of Navy has embraced a strategic concept of expeditionary warfare in the littoral areas of the world. While not turning his back on the open ocean, the Department has concluded the nearland ocean areas are most likely to generate the contingency or crisis challenges with which it must deal in the post-Cold War operations.

The current operations of the *Nimitz* and *Independence* battle groups in the vicinity of Taiwan is a demonstration of American resolve and an apt example. We are also aware that the Marine Corps concept of operational maneuver from the sea and its implications of both Marine Corps' force structure and equipment derive directly from the strategic principles contained in from the sea, and particularly the MV–22 Osprey, the Advance Amphibious Assault Vehicle, and the landing craft air cushion landing craft, the LCAC, all will contribute directly to realizing the capability for the Marine Corps to conduct operational maneuvers from over the horizon.

In earlier hearings, we heard testimony on other essential elements of this capability. Mine encounter measures, amphibious lift, consequently will be very interested in receiving your status report on the progress of programs over which the Marine Corps has direct oversight or hands-on involvement.

We also have a first-cut understanding from the Department's posture hearing of General Krulak's concern with the overall level of procurement funding when compared to resource demands of these programs. This hearing is going to provide an opportunity to gain a deeper appreciation of the dilemma that you face.

To a large degree, Mr. Douglass has to play with the hand that is dealt to him. While he can make clear his opinions concerning the resource constraints under which he must operate and we expect him to do so, his principal challenge is to organize and direct his Department's acquisition process and personnel so that the money made available to it is spent efficiently to satisfy the Department's highest priority requirements.

He also bears the burden of being able to explain his choices clearly and succinctly. However, Mr. Douglass is in an excellent position to advise the subcommittee on how additional funds could be invested in the most cost-effective manner should they become available.

Gentlemen, I am pleased to welcome you both. Mr. Douglass, let me take this opportunity, which I meant to do at the last subcommittee hearing, congratulating you on the recent birth of your first child, Alexander.

Based on past experience, we look forward to a well thought out, forthright explanation of your approach to meeting General Krulak's needs. General Krulak, this will be your first appearance before the subcommittee and consequently we extend a special welcome to you and look forward to your testimony.

I have given a very rapid recitation of a well prepared staff document and we will proceed. Senator Robb.

I should indicate for the record Senator Kennedy is on the floor with an amendment and he expects to be here following his presentation. Without objection I submit his written statement for the record.

[The prepared statement of Senator Kennedy follows:]

PREPARED STATEMENT BY SENATOR EDWARD M. KENNEDY

I join in welcoming Assistant Secretary Douglass and General Krulak to today's hearing.

I also welcome this opportunity to review the programs of the Marine Corps and its budget for the coming year. We may differ in Congress on various policies and priorities, but the whole country takes pride in the accomplishments of the Marine Corps in the past year. From Haiti to Bosnia, the Marines have faced a series of unusual challenges and done a difficult job very well.

The issues we will address today are vital to the Nation's security. The success of future Marine Corps' amphibious operations, governed by the concept of "Operational Maneuver From the Sea," depends in part on the Marine Corps' modernization program. Our subcommittee has a key role in considering the status of this program and in determining how to fund the necessary capabilities in the coming years.

We look forward to hearing more today about the modernization plan and the Navy's ability to support Marine operations. The subcommittee is especially interested in two capabilities—naval surface fire support and countermeasures against mines.

A further important issue is the importance of quality of life in the readiness of our forces. We must do everything possible to reduce the hardships facing our service members and their families as they make the daily sacrifices necessary to be ready to defend the Nation against any threat.

I welcome Secretary Douglass and General Krulak, and I look forward to their testimony.

In the meantime, Senator Robb, do you have an opening statement?

Senator ROBB. Mr. Chairman, I do not have an opening statement. I spent all day yesterday with CENTCOM and their Internal Look CPX and spent a good deal of time with some of the Marine Corps elements that were involved in that particular exercise and have some additional questions, but I will pose those at the appropriate time.

I thank General Krulak and Secretary Douglass for their appearance and I look forward to their testimony.

Senator COHEN. Thank you very much, Senator Robb.

Senator Lieberman.

Senator LIEBERMAN. I have no opening statement except to welcome the witnesses and to identify myself with your passionately stated opening statement.

Senator COHEN. I will keep that in mind as we move to the question session. General Krulak.

STATEMENT OF GEN. CHARLES C. KRULAK, COMMANDANT OF THE MARINE CORPS

General KRULAK. Thank you very much. I will try to keep my passion down. I have a problem sometimes with that. I would note that Secretary Douglass is wearing his Marine Corps tie and his gator pin, so we appreciate that.

Sir, it is an honor to be here this afternoon to meet with this subcommittee for the first time. I would say that before I even begin I would like to thank you, Mr. Chairman, for, one, your service to this subcommittee over the years and certainly as the chairman, and what it has meant to the Marine Corps to have this opportunity to meet and to discuss things that are of critical importance to our Corps and to our future, and we thank you so much for that.

Senator COHEN. In addition to thanking me, you should thank Colonel Terry Paul, sitting behind you, because without his assistance, you probably would not get as warm a welcome as you do.

General KRULAK. Do you hear that, Terry? What a man.

Senator ROBB. Mr. Chairman, could I comment that that is just an extension of the staff-prepared remarks. [Laughter.]

General KRULAK. Prepared by Terry, I imagine. [Laughter.]

General KRULAK. Sir, I have a statement for the record and would ask, Mr. Chairman, that you include my statement, if you would.

Senator COHEN. It will be included in full.

General KRULAK. I would also like to take just a second to very briefly describe the importance in my mind of seapower and of this committee, but in particular seapower. I think we need to put it in a strategic perspective and everybody is talking about the strategic environment changing and I agree with that.

I think that it is probably changing more rapidly than we have seen it change, certainly, since the end of World War II. The key here, though, is that the change is economic, it is cultural, it is political and the changes are in centers of gravity that I think are finding themselves moving more and more to the littorals and those littorals, in particular, found in the Persian Gulf, coming around and outside of the Gulf across the Indian Ocean and into the Pacific and it is there that I think that we will see our strategic challenges in the 21st Century.

The vast tyranny of the distances that are made up by that kind of open ocean and the littorals that are attached to that ocean make seapower critical and I think if Mike Boorda were here he would agree that the issue of seapower years ago was important but the issue of seapower in the 21st Century is going to be critical.

Economic growth is going to bring prosperity, prosperity to those littorals that I mentioned but it is also going to bring tremendous social and political upheavals as well as a proliferation of advanced weapons and military technology. I don't think I am overstating the case when I say that today's norms and by today's norms, what we will tomorrow is literally chaos in the littorals and is something that I am very concerned about.

That is why I believe that seapower, the ability to project our influence without the necessity for overflight rights, without the necessity for basing is so critical and it is vital to have forward presence in these littoral areas.

It is also why it is important that the investments that we make today are not entirely focused on a single view of what might be a war in the future because I believe every time we try to scope out what the first battle of the next war is going to look like, we either pick the wrong location or have the wrong war plan, and what we need more than anything is the flexibility that comes from the type of thinking that is involved in naval forces and what they bring in flexibility and adaptability to the wide range of requirements that we have in this Nation.

For its entire history, the Marine Corps has stood for this kind of adaptability. I believe that the budget that we have submitted reflects this. The programs and the operations issues that are before us today are not the product of a notional view of warfare or a finely scripted model. But instead, reflect hard experience, won over many a clime and place in a keen sense that our Nation needs forces that are broadly useful day in and day out, not just on a periodic, decisive basis.

With this usefulness comes, in my opinion, a requirement for frugality and efficiencies. For under 6 percent of the defense budget your Marine Corps gives you almost 15 percent of the combat power in DOD. When I say under 6 percent, I am not just talking about Marine specific items, I am talking about adding the amphibious ships that carry your Marines and the airplanes we fly. Under 6 percent gives this Nation 15 percent of its war fighting capability.

We take pride in our tradition of being careful stewards of the precious national resources of our Nation and we remain committed to providing the kind of force that gives you great capability with economical impact on the country.

The world will be employing forces during the next century. The world that we will be employing these forces in is going to be a complex one. It is going to be unpredictable. It is going to be very difficult. We need seapower, naval forces to be able to manage instability in that world and I can promise you that that is the goal of the Corps, that is the goal of our program and equally, if not more important, that is the goal of our thinking for future warfare.

I am prepared to answer any questions you may have, sir.

[The joint prepared statement of General Krulak and Mr. Douglass follows:]

PREPARED STATEMENT BY GEN. CHARLES C. KRULAK AND HON. JOHN W. DOUGLASS

MARINE CORPS PROGRAMS AND THE MARINE CORPS ROLE IN LITTORAL WARFARE

Mr. Chairman, distinguished members of the subcommittee, thank you for this opportunity to appear before you to discuss Marine Corps programs and the Marine Corps' role in the Department of the Navy's strategy for littoral warfare.

As we indicated in previous testimony to the entire Committee, as our world changes, its economic, social, cultural, and political centers of gravity are becoming even more concentrated along the littoral regions. Because of an increasingly interdependent global economy and the proliferation of highly lethal advanced military technologies, maintaining stability in these will become increasingly important to our political and military policy as we move into the 21st Century.

The littoral regions of the world, particularly the great coastal cities, well-populated coasts, and the intersection of trade routes represent a relatively small portion of the world's surface, yet provide a home to over three-quarters of the world's population, the locations for over 80 percent of the world's political capitals, and nearly all of the primary marketplaces for international trade. This concentration of economic and political power means that the littorals are also the places where most of the world's important conflicts are likely to occur in the next century.

OPERATIONAL MANEUVER FROM THE SEA

The centerpiece of our preparations for the future is an approach to expeditionary, littoral, and amphibious warfare known as Operational Maneuver From the Sea (OMFTS). While OMFTS will not define all Navy/Marine operations, the doctrine, organization, training and education, equipment, and support associated with it will provide naval forces with a solid foundation for future improvisation.

The heart of OMFTS is the application of naval power against objectives of strategic significance, aiming to exploit a significant enemy weakness to deal a decisive blow against an enemy "center of gravity"—something that is essential to the enemy's ability to effectively continue the struggle. OMFTS is distinguished by the extensive use of the sea as a means of gaining advantage, an avenue for friendly movement that is simultaneously a barrier to the enemy and a means of avoiding disadvantageous engagements. This includes, but is not limited to, the use of techniques such as sea-based logistics, sea-based fire support and the use of the sea as a medium for tactical and operational movement.

In effect, OMFTS is the application of maneuver warfare to maritime operations. In looking at future maritime operations, we focus on six principles of maneuver warfare.

First, OMFTS focuses on campaign objectives. It is not centered around winning the next battle, but rather in winning a succession of battles in such a pattern that the enemy suffers a strategically decisive reverse.

Second, within OMFTS, there is no conceptual distinction between land and sea in defining maneuver space. Naval forces will move between land and sea without pause or interruption. OMFTS involves rapid movement, not merely from ship to shore, but from ship to objectives that may be miles away from blue water and from inland positions back to offshore vessels. While some operations may require the establishment of bases ashore, the practice of separating ship-to-shore movement from the tactical and operational maneuver of units ashore will be replaced by maneuvers in which units move, without interruption, from ships at sea to their inland objectives.

Third, OMFTS seeks to create high operational tempo and momentum which overwhelms the enemy's ability to counter our actions. This requires the ability to apply sustainable force to a critical vulnerability faster than the enemy can effectively counter. This requires seizing and maintaining the initiative and operating at a pace that allows us to continually dictate the terms of conflict. An important element is operational surprise, which delays the enemy's ability to accurately assess the situation and disrupts his response. The rapid and uninterrupted buildup and concentration of combat power at decisive points ashore must be supported by complementary actions that fix, confuse, or neutralize the enemy. Maneuver of forces and -fires must be closely integrated, swift, and violent in their impact on the enemy. Our actions must remain proactive and focused, while the enemy should be kept reactive and ineffective.

Fourth, OMFTS applies strength against weakness. OMFTS projects combat power through gaps *located or created,* in the adversary's capabilities. These gaps are not necessarily geographical or physical voids they may involve capability (such as night fighting, command and control, etc.), sustainability, or morale. We typically think of caps in terms of a weakness we can decisively exploit to achieve our ultimate objective.

Fifth, OMFTS emphasizes intelligence, deception, and flexibility to drive planning, option selection, and maneuver execution. Timely collection, analysis, and rapid dissemination of usable information as well as tactical flexibility, are required to exploit the benefits of intelligence. OMFTS uses advance operations to deceive the enemy, determine his dispositions, attack his critical vulnerabilities, and initiate action to gain battlespace dominance. These operations are *executed specifically to find or create gaps* to be exploited. The inherent flexibility of OMFTS provides a wide array of options at all levels. Sea-based power offers the Nation choices in strategy and timing, the theater commander a highly mobile power-projection force, and the task force commander a wide range of tactical alternatives.

Finally, OMFTS involves the integrated use of all available assets in accomplishing the mission. This involves not only preserving unity of command, whether engaged in combined operations with allies or joint operations with other U.S. forces, but also planning for the employment of all types of warfighting technologies, not just those traditionally associated with ship to shore movement or other aspects of classic amphibious operations.

OMFTS is a very powerful operational concept, one which promises the ability to leverage our existing command of the sea to achieve decisive operational results. In terms of force modernization, however, it will require that we overcome the technical limitations we currently face in the following areas:

Mobility To move units from ships lying over the horizon to objectives lying far from the shore, we will require the capability to cross great distances, reduce the limitations imposed by terrain and weather, and, most importantly, to transition seamlessly, without pause or interruption, from maneuver at sea to maneuver ashore and vice-versa.

Intelligence. The high tempo of operations essential to successful OMFTS requires that intelligence be provided to decision makers with a minimum of delay. Technology that permits the rapid dissemination of intelligence products will play an important role in this effort.

Command and Control. Communications systems designed to provide a few headquarters with an overall view of the situation will have to be replaced by those that provide widely dispersed, maneuvering units with control over the information they need. The equipment to make this transition from communications nets to information networks has already been developed. The next step in leveraging this new technology work will be to instill fundamental changes in the skills and thought process of Marines at every level. The key to resolving this technical challenge lies more in the realm of education and doctrine than it does in the realm of hardware.

Fires. Successful execution of OMFTS will require changes in our approach to fire support. Improving our mobility ashore requires that we take greater advantage of sea-based fires and seek shore-based fire support systems with improved tactical mobility. To support rapidly maneuvering forces, we must streamline our fire support coordination procedures to improve responsiveness. To provide effective fires, forces afloat and ashore require the ability to deliver fires with increased range and improved accuracy and lethality. Finally, we will use fires to exploit maneuver just as we use maneuver to exploit the effects of fires.

Aviation. Our combat aircraft must be capable of operating from a variety of ships and austere bases ashore, as well as performing a wide variety of missions.

Mine Countermeasures. Because they limit the mobility of ships and landing craft in the contested littoral regions and can dramatically reduce the tempo of our operations, we must continue develop and enhance our ability to counter mines, particularly in shallow water areas and in and around the surf zones. Counter-mine/obstacle reconnaissance, mine marking and clearing capabilities, precision navigation, and in-stride breaching are critical to the capability to maneuver at sea, ashore and during the transition from sea to land.

Combat Service Support (CSS). The requirement to sustain fast-moving, powerful, combined arms forces conducting ship-to-objective maneuver will strain the best logistics system. Speed and mobility comparable to the assault forces' will be necessary for CSS elements responding to the dynamic demands of OMFTS. CSS flow must be efficient, secure, and timely, with the option to remain sea-based or to buildup support areas ashore.

Just as a littoral is formed by the meeting of land and sea, OMFTS is a marriage between maneuver warfare and naval warfare. From maneuver warfare comes an understanding of the dynamic nature of conflict, the imperative of decisive objectives, and the requirement for skillful operations executed at a high tempo From naval warfare are derived a deep appreciation for the strategic level of war, the advantages inherent in sea-borne movement, and the flexibility provided by sea-based logistics. OMFTS will couple doctrine with technological advances in speed, mobility, fire support, communications, and navigation to seamlessly and rapidly identify and exploit enemy weaknesses across the entire spectrum of conflict.

MARINE CORPS MODERNIZATION AND OPERATIONAL REQUIREMENTS

As the capstone concept of our operational vision for the next century, OMFTS is the engine driving our current modernization efforts and directly shaping current doctrinal thought and development. Emerging technology now makes this concept a near-reality and enables a tremendous increase in the flexibility, agility, and lethality of our Marine expeditionary forces while significantly expanding our Naval power projection capabilities. The following initiatives are essential to realizing the promise of OMFTS:

MV–22 Osprey: Today, the Corps stands on the threshold of a revolutionary capability employing 21st Century technology. Recognizing the tremendous operational advantages of such an innovation, the Marine Corps has championed the development of tiltrotor technology. The impact of this capability will be as far-reaching as the Marine Corps' introduction of battlefield helicopters in the Korean War. The MV–22 enables a revolutionary approach to power projection operations, and *remains the Marine Corps' number one and most critical acquisition priority.* This tiltrotor aircraft (part rotary wing/part fixed wing) allows combat power to transition ashore faster and increases the depth of the battlefield through its enhanced range, endurance, and flexibility. With a cruising speed of 270 knots and carrying 24 combat loaded Marines, it replaces the aging medium lift CH–46 Sea Knight and CH–53D Sea Stallion with increased capabilities while providing significantly greater tactical leverage. This aircraft is also strategically mobile, and is capable of global self-deployment with its aerial refueling ability. The combination of range, speed, and payload of the MV–22 nearly triples the depth of the present day battle space. This significantly complicates an enemy's defensive requirements and inhibits the opportunity to concentrate his forces. This aircraft allows Navy ships adequate stand-off distance to respond to systems such as shore-to-ship missiles, enhanced observation, underwater mines, and other developing threats. The MV–22 is integral to making OMFTS a reality.

Advanced Amphibious Assault Vehicle (AAAV): The AAAV is critical to our future ability to project power inland from amphibious ships. Increased speed and survivability allow a faster buildup of combat power ashore, ensuring greater force survival and effectiveness to fight the land battle. These capabilities expand our ability to implement tactical maneuvers from ship to objective area from over-the-horizon, creating significant operational advantages. When the AAAV is fully fielded it will replace the current AAV7A1 family of amphibious assault vehicles which will reach the end of their service life within the next 10 years.

The AAAV is especially important to provide a truly capable surface assault force that can quickly secure a landing area and build up forces rapidly to face increasingly sophisticated threats. The ability of the AAAV to swiftly and independently transit from over-the-horizon provides the spear of the assault and frees up LCACs to bring in the needed supporting firepower immediately behind. This *one-two-punch* may very well be the decisive factor in the success of the assault. In addition to its high speed enabling transit, the AAAV will bring superior land mobility and tremendously increased firepower compared to the current assault vehicle, allowing us to seamlessly link maneuver at sea with maneuver ashore. It has been approved to proceed into its Demonstration/Validation Phase and fulfills a critical deficiency in the over-the-horizon forcible entry capability that is a key component of OMFTS.

Shallow Water Mine Countermeasures (SWMCM): This effort is designed to improve critical deficiencies in none countermeasures. The development of this technology and systems to detect, clear, and neutralize these threats is vital to allow our forces to maneuver unencumbered throughout the littoral areas under the OMFTS concept and to effectively project power ashore.

Naval Surface Fire Support (NSFS): This is an essential dimension of our power projection capabilities. The current program is focused on development of a high energy gun modification to the existing 5-inch/54 caliber mount and the Extended Range Guided Munitions (ERGM). This program is expected to meet Marine Corps operational requirements by fiscal year 2001. The long-term program calls for the development of a larger caliber gun and/or the shipboard adaptation of extended range missile systems similar to ATACMS, Sea SLAM, or Standard strike variants. These enhancements will provide a critical boost to Marine amphibious capabilities and result in extended, more accurate, and more lethal support to maneuver forces ashore.

Technological advances are enabling the Marine Corps to rapidly advance OMFTS from the concept stage to reality. Our acquisition focus will be on technological initiatives that provide a cost-effective improvement to the mobility, flexibility, and lethality of our Marine expeditionary forces. Support for these programs will be in concert with both the National Military Strategy and the objectives of the Marine Corps in supporting that strategy.

In addition to the W–22 and the AAAV, our other major modernization efforts consist of the Medium Tactical Vehicle Remanufacture (MTVR); the AV–8B Remanufacture; the AH–1W (4 BW)/UH–1N (4 BN) helicopter upgrade programs; the Lightweight 155mm Howitzer (LW155); and the JAVELIN and PREDATOR short range anti-armor weapons. Additional modernization priorities include the Joint Advanced Strike Technology (JAST) program, which will lead to the short take off/vertical landing version of the Joint Strike Fighter in the year 2007 and beyond; and the Marine Air Ground Task Force (MAGTF) Command, Control, Communications, Computers, and Intelligence (C^4I) System.

MTVR. The primary mission of the Marine Corps medium tactical wheeled fleet is logistical support. This fleet transports general cargo, personnel, ammunition, bulk fuel, water, shelters, and standard containers in addition to being the prime mover for Marine Corps artillery. The medium fleet's central logistics role and the expeditionary nature of the Marine Corps require mobile, yet self-sustaining, systems that can maintain full mission capabilities pending buildup of extensive combat service support ashore.

The current Marine Corps medium tactical vehicle fleet, which consists of the M939A1 and M809 series trucks, will begin to reach the end of service life in fiscal year 2002. The poor mobility, limited load carrying capacity, and age of current vehicles make replacement or modernization mandatory. The current fleet requires improvements to overcome deficiencies in off-road mobility, off-road speed, payload lift capacity (particularly for high density loads such as ammunition and bulk liquid), and reliability and maintainability.

The MTVR is designed to correct these deficiencies by upgrading the current system through a remanufacturing process. Remanufacture is preferred because it is more cost-effective than buying a new system. The program will integrate commercially available components into the current vehicle, e.g., electronically controlled power trains and improved suspensions. The new vehicle will increase mobility, payload capacity, sustained speed over rolling terrain, and will be easier to operate and maintain. The increased speed and mobility will allow operational forces greater flexibility to rearm, refuel, and resupply where it makes the most tactical sense and not where the current limited logistics train dictates. The MTVR will give the Marine Corps a fully mission-capable, robust, medium vehicle to meet the demands of supporting Marine operational forces in increasingly difficult terrains. This program has validated the concept of integrating existing technology to improve mobility, payload, speed, reliability, and maintainability.

AV–8B Remanufacture: The Marine Corps is pursuing a remanufacture program for 72 older "day-attack" aircraft to the current radar/night-attack standard, at approximately 80 percent of the cost of a new aircraft. Within the Marine Air Ground Task Force we rely heavily on aviation assets to offset limited amounts of organic artillery and tanks. The V/STOL capability of the AV–8B is well-suited for providing dedicated close air support to Marine ground forces, and the addition of night attack and radar capabilities will allow the Harrier to be responsive to the needs of the MAGTF for expeditionary night and adverse weather offensive air support. The program calls for the procurement of 72 aircraft are programmed through fiscal year 2001.

AH–1W(4 BW)/UH–1N(4BN): The 4BN/BW program replaces the current two-bladed rotor systems on the UH–1N and AH–1W aircraft with a new, four-bladed, all-composite rotor system coupled with a sophisticated, fully-integrated cockpit and planned state of the art technical enhancements. In addition to the new rotor system major modifications include a new performance matched transmission, a new four-bladed tail rotor and drive system upgraded landing gear, and for the AH–1W, structural modifications to support six weapons stations. The 4BW increases aircraft agility, maximum continuous speed, and payload. The advanced cockpit reduces operator workload, improves situational awareness, and provides growth potential for future weapon use and joint interoperability. It integrates on-board planning, communications, digital fire control, self-contained navigation, night targeting, and weapons systems in mirror-imaged crew stations. The 4BN incorporates the 4BW rotor system and dynamic components, maximizing commonality and supportability between the two aircraft. The 4BN program restores adequate power margin for the aircraft, adequate mission payload, and warfighting capability growth potential. This program reduces life-cycle costs, significantly improves operational capabilities, resolves existing safety deficiencies, and extends the service lives of both aircraft. The commonality between aircraft greatly enhances the maintainability and deployability of both aircraft, which are supported and operated within the same squadron structure.

LW155: The LW155 howitzer will provide MAGTFs organic artillery fires. The LW155 will retain the current M198 155mm howitzer's range while providing considerably improved transportability by both air and ground systems. This howitzer will give the MAGTF commander greater operational and tactical flexibility in executing his mission. The increased mobility of the LW155 will significantly improve artillery ship-to-shore and across-the-beach movement while increasing the survivability, responsiveness, lethality, and efficiency of artillery units supporting OMFTS. The program is currently in the Concept Exploration and Definition Phase in Research and Development. Testing and selection of a single howitzer from the three current competitors is scheduled to occur during April to December 1996, with EMD contract award scheduled to occur during the 2nd Quarter fiscal year 1997.

JAVELIN: Formerly the AAWS–K JAVELIN is a medium-range, man-portable, "fire-and-forget" weapon system that will replace the DRAGON antiarmor missile system in the infantry battalion. We have a continuing urgent requirement for a man-portable, antiarmor weapon system capable of engaging and defeating the enemy armor threat, and JAVELIN will replace the DRAGON medium antitank weapon system which is ineffective against the improved conventional and explosive reactive armor on existing threat vehicles. JAVELIN satisfies an operational requirement to provide increased mobility, reliability, higher hit/kill probability, and greater effective range (2,000m) against current and future armored threats. The U.S. Army and the Marine Corps are jointly participating in the development of the JAVELIN, with the Army as lead service.

PREDATOR: The PREDATOR Short Range Assault Weapon program will provide a light weight (<20 lbs.) anti-tank weapon to replace the much less capable AT–4. Despite its lightweight and low cost, with PREDATOR the individual Marine can defeat modem main battle tanks even with explosive reactive armor. Currently in Engineering and Manufacturing Development, PREDATOR should be ready for a production decision in fiscal year 1998. This program is a joint effort with the Army for delivery of their Multi-purpose Individual Munition.

JAST: The JAST program will provide the next generation tactical aircraft for the USMC, replacing the AV–8B and F/A–18C/D aircraft with a single Short Take-Off and Vertical Land (STOVL) platform. The Marine Corps requirements-for this aircraft are focused on readiness, expeditionary capability, and the combined arms concept. The primary missions for the Marine Corps Joint Strike Fighter will remain close air support, interdiction, and anti-air warfare. Secondary missions will include suppression of enemy air defenses, command and control of aircraft and missiles, and reconnaissance. Delivery of this aircraft, which will begin around 2007, will solve our problems of aircraft aging and attrition while meeting our goal of "necking down" to a single type aircraft.

MAGTF C^{4}I: The MAGTF C^{4}I systems concept originated in 1993, to accelerate and unify the development, procurement, and fielding of command and control support systems for the FMF. The principal component systems are summarized as follows:

Tactical Combat Operations (TCO): The TCO system will provide MAGTF commanders an on site automated capability to process battlefield information. Marines will soon share the same automated operations system currently in use by the Navy and the Coast Guard. The Naval Tactical Command System-Afloat (NTCS–A), the shore-based Operations Support System and the Marine TCO system are all built around the same Joint Maritime Command Information System, Unified Build (JMCIS UB) core software. For the past 10 years, JOTS has evolved to provide greater capability to commanders afloat by displaying air, ground, and maritime tracks worldwide. Digital maps available from the Defense Mapping Agency on CD–ROM disks can be loaded and displayed on JOTS with JMCIS UB. This system will link the operations sections of all FMF units of battalion/squadron size and larger. Marine forces embarked aboard Navy ships will "plug in" their MAGTF C^{4}I systems to the Naval Tactical Command System-Afloat. When ashore, MAGTF C^{4}I will allow interoperability with joint forces over internal and external communications. Operational testing of the Marine TCO system occurred in June 1995. Marine Expeditionary Force (MEF) and Marine Expeditionary Unit (MEU) headquarters elements currently have an interim capability using test bed computers and software.

Tactical Data Network (TDN): The TDN consists of a network of interconnected Gateways and Servers. These systems and their subscribers are connected by a combination of common user long-haul transmission systems, local area networks, single channel radios, and the switched telephone system. This network provides basic data transfer and switching services; access to strategic, supporting establishment, joint, and other service component tactical data networks. Network management capabilities and value-added services such as message handling, directory services, file sharing, facsimile handling, and terminal emulation support are also available. The TDN Gateway will be deployed at the MEF and Major Subordinate Command level and will provide access to the Nonsecure Internet Protocol Router Network (SIPRNET), Secret Internet Protocol Router Network (SIPRNET), and other services' tactical packet switched networks. It will be in a mounted shelter for mobility. The TDN will give Marine Corps tactical users the ability to transition from AUTODIN to its mandated replacement system, known as the Defense Message System (DMS). It augments existing MAGTF communications infrastructure to provide the Commander an integrated data network. Together they form the communication backbone for Marine Air-Ground Task Force Tactical Data Systems.

AN/PSC–5 Enhanced Manpack UHF Terminal (EMUT): The AN/PSC–5 EMUT is a lightweight, manpack, Line-of-Sight (LOS) and Tactical Satellite Communications (SATCOM) terminal that will serve as a primary command and control Single Channel Radio (SCR) for MAGTFs and their elements. Ultimately, it will be employed down to the battalion and reconnaissance team level, allowing increased ranges and reliability for inter/intra-MAGTF as well as theater connectivity. The terminals will be used by elements to transmit intelligence traffic, to interface with and retransmit Single Channel Ground and Airborne Radio System (SINCGARS) communications, and to receive command and control traffic.

Ground Mobile Forces (GMF) Tri-band Tactical Satellite Terminal: The GMF Tri-band satellite terminal program is a COTS/NDI integration effort that will combine commercially available satellite equipment onto a pallet. The pallet will then be mounted on an M1097 High Mobility, Multipurpose Wheeled Vehicle (HMMWV). It will provide an increased channel capacity over the Defense Satellite Communications System (DSCS), and it will provide the additional capability of communicating over C and Ku bands on commercial satellites. The GMF Tri-band program will provide the Marine Forces self-contained, rapidly deployable, satellite terminals capable of communicating over the existing DSCS and commercial satellites. This program will initially augment and then replace the current GMF satellite terminals. It also offers the ability to use civilian satellites to ease the congestion on military systems.

Digital Technical Control (DTC): The DTC facilitates the installation, operation, restoration, and management of digital trunk groups, and contains the monitoring, testing, and patching equipment required by technical controllers to troubleshoot and restore faulty circuits and links. It will act as a central management facility terminating most communication links and individual circuits for major commands and will allow the MAGTF commander to install, operate, and maintain the supporting C^{4}I system. The DTC, along with the Unit Level Circuit Switch Tactical Data Network, Tactical Communications Central, and various multichannel radios, will form the backbone of the Marine Corps digital communication network. The DTC will integrate the communications assets of a node into an efficient system that provides the commander seamless communications while making efficient use of limited bandwidth and equipment.

Intelligence Analysis System (IAS): IAS is the MAGTF echelon-tailored, all-source intelligence fusion center that is the hub of the Marine Air-Ground Intelligence System (MAGIS). MEF IAS is a sheltered, mobile system with multiple analyst workstations in a client-server LAN configuration. IAS hosts the Secondary Imagery Dissemination System (SIDS) and has provisions for communication links with other intelligence agencies and systems at the National (DOD Intelligence Information Systems (DODIIS)), theater, and tactical (including TCAC, TERPES, and JSIPS) levels.

MAGTF Secondary Imagery Dissemination System (SIDS): The Manpack SIDS device provides the capability to electronically collect, transmit, and receive imagery products throughout the MAGTF, as well as to adjacent, higher, and external commands. It uses available communications paths. MAGTF SIDS will be procured in two configurations. One configuration is the Intelligence Analysis System (IAS) hosted SIDS. The other is the Manpack SDDS. They will be distributed throughout the MAGTF and will comprise the foundation of the SIDS network. Both allow the user to display, manipulate, annotate, print, transmit, and receive images on a multipurpose intelligence workstation.

Joint Tactical Information Distribution System (JTIDS): JTIDS is an advanced radio system that provides secure, jam resistant information distribution, position location, and identification capabilities in an integrated form for tactical military operations. The Marine Air Command and Control System (MACCS) requires a JTIDS capability for interoperability and to perform its mission in a joint environment.

Technical Control And Analysis Center (TCAC) Product Improvement Program (PIP): TCAC PIP will provide the MARFOR Radio Battalions a fully capable Signals Intelligence (SIGINT) fusion center mounted on the platform. By providing automated processing, analysis, and reporting capability, TCAC PIP will enhance the overall control and management of SIGINT assets as well as the development and dissemination of SIGINT products. To provide the MARFOR Radio Battalions the most capable, mobile, and rugged system possible, TCAC PIP capitalizes on state-of-the-art hardware and software technology and an evolutionary development strategy. Compared to the current TCAC system, TCAC PIP will greatly increase the quality and timeliness of SIGINT products provided to MAGTF commanders, while decreasing the amphibious/airlift requirements for system deployment.

MODERNIZATION AND FUTURE REQUIREMENTS

Although this year's defense budget finds a ready Marine Corps, we remain concerned about the level of investment in equipment and new technology over the long term. Shortfalls in this area inevitably tax our long term combat readiness, and it is critical that we not have any further deferral of modernization spending. Our current plans call for steady real increases in procurement, so that by fiscal year 1999 procurement will reach levels approaching the long term average needed for a steady state sustainment of capability. Nevertheless, investment for future readiness will be a continuing concern for the foreseeable future.

As we have noted in previous testimony, we are doing everything we can in the short term to enhance the impact of our modernization funding. Wherever possible, we are doing more with less—stretching dollars. That's why we are happy with the Medium Tactical Vehicle and AV–8B remanufacturing programs and the AH–1W (4 BW)/UH–1N (4BN) programs—they will extend and improve our operational capabilities at less cost of buying new equipment. Where we can leap ahead in technology, we are doing so—as our continuing commitment to the AAAV and MV–22 shows. We are pleased that a production decision has been realized and that funding has been allocated in the FYDP. The current procurement profile for the MV–22 results in an initial operating capability in fiscal year 2001 with achievement of full operational capability in 2017.

We believe the fiscal year 1997 budget adequately funds the capabilities we require for *today*. That said, we must stay on track with the investments needed to produce the right capabilities for tomorrow and the day after tomorrow. OMFTS is a very powerful and promising concept, with great applicability to the strategic landscape that we believe looms over the horizon. The technologies to make this concept work are within our reach, and we strongly urge your continued support for them in the years to come.

Thank you.

Senator COHEN. Thank you very much, General Krulak.

Secretary Douglass, do you have a statement you would like to make?

STATEMENT OF HON. JOHN W. DOUGLASS, ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH, DEVELOPMENT AND ACQUISITION

Mr. DOUGLASS. As General Krulak noted we have a joint statement, sir. I would, however, add a few very brief remarks to what the Commandant said.

First of all, I absolutely and completely endorse his remarks. As you know, Secretary Dalton has made a major effort to bring the Marine Corps and the Navy team closer together in the last couple of years. I am pleased to report that in the time that I have been there, I have been witness to much of that.

General Krulak often comes to my office and I go to his to solve problems on a real-time basis. This is something we could not have done a few years ago without Secretary Dalton's leadership to bring the team together in the Pentagon. This initiative seems to me to be on track and showing positive results.

The Commandant spoke, sir, of vision, a vision of the future, a vision of what seapower offers to the future. I spend much of my time thinking about that and trying to move the Navy and Marine Corps technology programs toward the vision that the Commandant and the CNO have of the future.

As the Commandant commented, we are in a period of time, sir, a period of history that we have not even have a name for. We define where we are today by where we used to be. We call this the post-Cold War period. That is symbolic to me of the ambiguity that we face in trying to plan for the future. As we try to plan for the future, it is more difficult than it was in the more structured era of the Cold War. We can no longer rely, as we did before, on superb models of what our enemy might be because, as the Commandant said, the possible enemies of the future are changing as quickly as the world is changing.

This puts us in a situation where, when we plan new systems for the future, we have to think very carefully about both requirements pull—in other words, what do warfighters think the need to do certain functions; and technology push, what capabilities will be available in the world both to ourselves and to any potential enemies. I feel that the mix of requirements and capabilities in regards to Marine Corps equipment is working well.

Finally, sir, I would like to say that those Marines who are given to me by the Commandant to manage the programs that fall under my authority and all excellent individuals. The management of the principal Marine Corps programs under my oversight is solid and sound. I have been very pleased with the quality that I have seen. I owe the Commandant congratulations and I am in debt to him for that.

With that brief summary, sir, I am prepared to answer any questions the Members might have.

Senator COHEN. Probably the first question is, did you have your staff prepare your joint statement? You do not have to answer that.

General Krulak, would you lay the groundwork for some additional questions on your programs by describing the concept of operational maneuver From The Sea? What is that?

General KRULAK. The heart of OMFTS is what we would call the application of naval power, seapower, against objectives of strategic significance, not just tactical or operational significance. It is distinguished by the use of the sea as well as land as maneuver area.

If you go back, and let us use the Army as an example, go back to the Army's brilliant maneuver during Desert Storm, their big left hook around the flank of Iraq and Kuwait. If you took that and moved all of that area to sea and used that same mindset of being able to come from the ocean, using that as that open desert, and been able to maneuver at will and use the water as your land and at the same time is a barrier to the enemy, then you get an idea of the capability that operational maneuver from the sea that includes both the sea and the land as maneuver space brings to the battle.

It has basically six principles. One issue focuses on the campaign objective, again not just on a specific battle but the idea is to win a campaign. Second, that there is no distinction between land and see and therefore you can use the sea as a place to put your logistics, use the sea as the originating location of your fire power, use the sea for medical purposes and things along this line. You do not have to use land as a buildup of forces ashore. It envisions high op tempo and high op tempo in regards to the enemy. You are moving so rapidly, your tempo is so rapid that his ability to make decisions is limited because you are always within his decisionmaking loop.

It is very much like what I am afraid we are going to see used against us in the world of chaos and that is there will be the strength, our strength against the enemy's weaknesses. The whole idea, as an example in mines, is to avoid the mines through intelligence and ability to maneuver using the sea as maneuver space.

Finally, it is obviously a great deal of emphasis on the gathering of intelligence, the use of deception and a very good communications network. Those are kind of the pillars of operational maneuver from the sea.

You spoke correctly, sir, when you mentioned that it was and is the operational concept and underpinning for the naval strategic thought of from the sea, forward from the sea.

Senator COHEN. You have written and spoken about the need for the Marines to prepare for the challenges that occur the day after tomorrow. Do you want to give us an example of what the Marines have done to prepare for the day after tomorrow?

General KRULAK. Yes, sir.

Senator COHEN. That is the name of a very popular novel, by the way.

General KRULAK. It was not taken from the book, sir. But what we have done is in November this year, stood up something called the warfighting laboratory down at Quantico, Virginia. Under the warfighting laboratory is a series of experiments that are aimed at getting us, as I mentioned, to the day after tomorrow.

This series of experiments is entitled Sea Dragon. Sea Dragon, unlike some of the other laboratories around the country, is aimed at putting steel on target, not waiting for 5 or 6 years to get results but to get results quickly. It is not just technology-and equipment-oriented. It is oriented towards training, education, doctrine. It covers things such as chemical and biological warfare, the use of nonlethal technologies. It covers a wide gamut of evolutions that are designed to bring us into the ability to fight in a battle in the 21st Century, no matter what that battle brings.

We recognize that resources are constrained and one of the things we are driving at is that if you cannot have all the money you need to modernize your equipment, that does not prevent you from modernizing your mind. A great deal of the effort in Sea Dragon is devoted towards modernizing the mind of the individual Marine, whether he be a young Lance Corporal fighting on an expanded battlefield or the officers that are leading.

There are a lot of experiments. We are working in urban warfare. We look at the threat—and I would just ask and I say to my Marines, Imagine an enemy with the cunning and the ferocity of a Chechnyan rebel but is armed with a weapon that can sense you and upon sensing you can kill you.

What does that do to your combat formation? What does that do to the way you organize and equip for combat, how your tactics and techniques evolve and what kind of doctrine you use?

Senator COHEN. It probably concentrates his mind wonderfully.

General KRULAK. But basically, my view is if we do not start looking beyond the major regional contingencies that we are looking at right now and look to what is probably really going to be out there for us in the 21st Century, we are missing a boat.

My point, and I think Mike Boorda and Secretary Dalton and John Douglass, and everybody else that is involved in the acquisition process is we have got to somehow focus on those things that are going to make a difference in that kind of environment. We are a 911 force. That is what we do and we need to be prepared to 911 it against a whole spectrum of enemy.

Senator COHEN. General, last year when General Mundy came before the committee he testified about the great disparity between the fiscal 1996 budget and the historical norm. What is your assessment of the fiscal 1997 budget in terms of its adequacy to meet this world of chaos that you have described before as unable to predict due to the unforeseen challenges that the Marine Corps and the country are going to contend with?

General KRULAK. I think historically, if you go back to 1971 and run, say, procurement Marine Corps until today, the average has been about $1.2 billion a year for procurement. That is the average. This year it is $556 million. Under the fiscal constraints, that is the best we could do. I mean, we worked hard to get that. Our main goal, because we are the 911 force, is obviously readiness. I mean, we have got to be ready. That is what the 2nd Session of the 82nd Congress demanded of us—to be the expeditionary force in readiness, most ready when the Nation is least. So a large chunk of our money goes to that readiness equation.

In the out years of the Future Years Defense Plan, we see our procurement getting a little better.

Senator COHEN. Well, it has to get better, does it not? You have got the AAAV, the V–22, amphibious ships. Where is that money going to come from?

General KRULAK. That money, as you indicated, is getting better. It is not there yet. We are not where we need to be, and we are concerned about that.

We are doing a lot of things to try to make it fit. A good example is the remanufacture of our AV–8's. I mean, you are getting an aircraft that has got a great fuselage and an engine, but it is costing less than a new model. We are remanufacturing our trucks. We are doing things along that line. But the reality is there are going to be problems in the out years.

Senator COHEN. Let me just express an opinion here. One of the problems we have is year after year not only does the Marine Corps but the other services come before the committee and they say this budget is adequate for us to meet our mission goals. We sit here, or at least I sit here, and look at what your requirements are and what the budget is and say it is not going to work. We then come up and say, well, if you had more money, what would you do?

Now, the game that is played, and has been played historically over all administrations, is that you submit a budget which you know is not adequate to do the job that is necessary, and we sit here and say, well, if you had more money where would you put it in terms of your priorities, and we all know where they are. So it is being budget constrained, and you are required to come up and say yes, we can do the job, but it is getting thinner.

How many times have the members of this committee heard General Mundy and others come before the committee and say, well, this is it. We can do it this year, but not much longer. So then it comes to the committee to have to increase the funding, and then we go to the floor and we get taken to task by our colleagues saying look how much money over and above the President's budget that the Congress has now mandated.

So we have this problem where our services come forward saying we can do the job, but it is getting more difficult; Congress then has to appropriate more money; and then we are accused of bloating the defense budget well beyond the administration request. Frankly, I do not think that enough is being requested to do the job that is necessary. Personal opinion; I yield; my time is up for the moment. Senator Robb.

Senator ROBB. Thank you, Mr. Chairman. Unfortunately, the Marine Corps has been budgeting on that basic cycle since about 1948, as I recall, and I do not think anything is likely to change.

Let me just address a question to the Commandant——

Senator COHEN. They had hoped when you came to the Senate that it might change, Senator Robb.

General KRULAK. We had our fingers crossed, sir. [Laughter.]

Senator ROBB. Hope springs eternal. [Laughter.]

Senator ROBB. Yesterday I mentioned that I had a very good day. I spent the day with CENTCOM and Internal Look, and I spent a fair amount of time with General Howell and General Neill, among others, and part of the briefing that General Howell gave, wearing one of his three hats, did have to do with resources. I will not go into a lot of detail, but it was clear to me that there were needs that exceeded the current provisions within the budget that we are dealing with, and particularly communications.

We have had some horrendous examples of lack of interservice communications capability, interoperability, and what have you, in recent contests, even the Gulf War, which was much improved, certainly, over Grenada, et cetera, and we know some of the horror stories. But it sounded as though there was a fairly significant punch list that he had in mind for things that he knew he was going to have to try to come up with if he were going to fulfill the missions that are assigned to him.

I wonder, just in terms of that ability, you made a comment a minute ago, that we are doing something with modernizing minds, m-i-n-d-s, as opposed to mines that we were talking about earlier, and yet if we do not have some of the equipment, particularly in communications, some of the best minds in the business may be only scribbling notes for their historical journal entries.

What can you tell us about the funding level, specifically in the ability to communicate and to have reliable communications with other services when we get into the purple areas?

General KRULAK. That is a very good question, sir. I talked to Jeff Howell, myself, about this very issue. As I think the Senator knows, this year is a big year for us. We will, for the first time, complete our buy of SINGARS. That is what he was talking about. The reality of life is the Marine Corps is completing its total buy of SINGARS this year. We are well behind the Army in that regard. This will give us the capability to do the types of things that I wanted to do when I was Commander of Marine Forces Pacific, and certainly what Jeff Howell is trying to do. That is going to make a big difference to us.

I think also that Jeff was articulating the concern of coalition warfare. It is one thing to be able to talk on the joint battlefield, but when it is joint and coalition you have a problem and you end up not being able to communicate with your coalition partners and you do what you and I did in Vietnam, and that is liaison teams with SINGARS radios on their backs acting as the basic communication nodes for the coalition forces. So this is something that is certainly understood by the combattant CINC's, understood by the Joint Staff, but it is an issue that we are worried about.

There are several very important intelligence capabilities that we are bringing on this year also. This year is probably the best year we have had in C^4I for the Marine Corps in an awful long time. I think I shared that with General Howell. I think he is aware of that. But he is like me when I was out in the Pacific. If it is not in your hands, do not tell me about what you are buying. He wants to see it. He will see it this coming year.

Senator ROBB. All right, I am going to perhaps follow up for the record with some of the specifics that I do not think would be useful to explore here.

General KRULAK. Okay, sir.

Senator ROBB. But if you could, talk a little bit about the adaptation to technology innovations generally. Again just using my most recent experience observing Internal Look, I noticed a much more advanced availability, at least, in this operation of advanced technology gear, not only in the intelligence area and a lot of things that would be inappropriate for discussion here, but even with respect to regular communicating. Almost everybody had at least their own portable computer terminal that was set up and operating.

Are we taking sufficient advantages of some of the advances in this area, and is that one of the central areas that you are looking into in your warfighting laboratory in Sea Dragon, and what have you?

General KRULAK. That is exactly what we are doing, sir. The answer to your first question, we have not been taking the advantage we probably should have. Second, we need to do it now very smartly, because there are some things that are just one generation away that will add tremendous capability, and that we are testing at the lab right now, everything from the ability to have what might well be thought of as a cellular telephone that has GPS in it that has the capability very similar to a Nikon camera to do a rangefinder right with that radio. Punch a button, it tells you where you are, distance to the target, automatic shot up to an aircraft above, and within a matter of seconds you have bombs on target.

We need to get to that point. I believe we can get there very quickly because I think the technology is already available. It is just how you know that, and how you get industry to join in that effort, to help fund some of the R&D to come up with this capability, because we have the cellular telephone, we know a Nikon camera can do a rangefinder very cheaply, and we know we can do a digital burst to an overhead platform. Now, it is, how do you tie that together to put the steel on target? That is what we are doing, sir.

Senator ROBB. Thank you, General. There is one question I was going to follow up with, but with my colleague Senator Smith here, I know that he is interested in leading, and I am going to defer on that question.

My time is up. I thank you, Mr. Chairman.

Senator COHEN. The chair now calls on another former Marine.

Senator WARNER. Well, totally without any bias.

Senator COHEN. Actually, it was in the way of a mild criticism. Senator Robb indicated that the Marine Corps budget has been historically underfunded, and there were high hopes that when he came on the committee it might exceed that historical norm, and I thought with the two of you that might be a one-two punch to get the Marine Corps budget up.

Senator WARNER. Fine. That leads me into my question.

I do not have a date time group on this, but apparently it is very current, and it carries a quotation by General Mundy, the very distinguished recently retired Commandant, saying, "Department of the Navy blue dollars that fund some Marine Corps programs have a distressing tendency to suffer from a blue-green split, and too often resembles a horse and rabbit stew." I think he is getting a little carried away here with his metaphor, but, "One horse and one rabbit. It is time for a change."

Now, when I was privileged to be in the Navy secretariat, that was an annual debate. I expect it goes back to the time of John Paul Jones. However, I think that you might, Mr. Secretary, tell us what your views are for the record on that. I take this from General Mundy, for whom I have the greatest respect as being his professional opinion, which he now freely expresses in his retired status. I think it is important this committee take into consideration that distinguished Marine's view and have an official comment on it.

I handed you this to alert you to the question. We will give you a copy of this and you can supplement for the record such additional testimony as you wish to answer for the various points in here, but would you like to give an overview with the understanding that you will supplement for the record?

Mr. DOUGLASS. Yes, thank you, sir. Probably the best way to describe what I think has changed since you were there, sir, in the Secretariat, is the way the program and financial requirements of the Navy and the Marine Corps are developed. In the past it was a stovepipe process, up through the CNO and Commandant and then to the Secretariat. At that level there was an attempt to reconcile those two differing lists of program requirements given the total top line that the Department had for its budget.

What we have tried to do now is integrate those two stovepipes. I have only been through one cycle of this in the 150 days that I have been over there. There is a process called the IBR—Investment Budget Review—in which we look at our financial requirements for the year that is before us. We have a Navy person there on the right and a Marine Corps person there on the left, and they go through all of the areas that General Krulak has mentioned in terms of projecting power from the sea. They list, side by side in each area, what the requirements of the Navy and what the requirements of the Marine Corps are. This allows the Secretary to see the balance in every phase of the program.

Senator WARNER. Let me interrupt you, Mr. Secretary, because I want to slip in one additional question within the allocation. This was a matter that, as I say, has been going on for a number of years, and it is perfectly understandable how it arises out of the uniqueness of the Department of the Navy in which one Secretary has jurisdiction over the Marine Corps team but they maintain a measure of independence. The Commandant of the Marine Corps has a mission to fight for everything he can get, the Chief of Naval Operations likewise. That is understood. That it is the way it should be and always will be. But, it is the job of the Navy Secretary to arbitrate in the best interests of the overall national defense of the country the allocation of those dollars.

I have no basis on which to say that this allegation is correct or is flawed in some way, but I am asking you directly to take it up with your Secretary and respond to this committee, because we should have your best advice as to how you handle this annual situation between two independent, although Navy-Marine Corps team. All right?

Mr. DOUGLASS. We will certainly be pleased to do that.

[The information referred to follows:]

In an effort to more efficiently allocate funding within the Department of the Navy and to enhance coordination and integration between the two independent services, the Commandant of the Marine Corps has recently completed his move from the Navy Annex to the Pentagon. With the Chief of Naval Operations and Commandant of the Marine Corps co-located adjacent to the Secretary of the Navy, the lines of communication have been improved significantly, enhancing the Navy-Marine Corps team. Further, by combining the Marine Corps' *Operational Maneuver From the Sea* and the Navy's *Forward From the Sea* into a common doctrine—The Naval Operational Concept in the Littorals for the 21st Century—the working relationship between the two services has become much closer. Utilizing the Investment Balance Review, Bottom-Up Review and Joint Warfighting Assessment processes to identify concept-based requirements, the Navy-Marine Corps team in partnership as co-equals, is more capable to met expanding challenges and needed capabilities in ever changing, fiscally constrained times of uncertainty in the 21st Century. As a result of these efforts, such programs as LHD7, LPD17, LCAC, V–22, AV–8 Remanufacture, AAAV, MPF Enhancement, Mine Warfare and Non-Lethal capabilities are all working together in harmony to strengthen a more lethal Navy-Marine Corps team for tomorrow.

Senator WARNER. Now, the chairman very properly, General Krulak, brought up the dilemma that the Congress finds itself in from time to time where a President has shortfalled what we regard as a bottom-line figure. In this instance, many of us feel the 242 is too small, and if it is in the infinite wisdom of the Congress to add those dollars, we should do it in a judicious way. The chairman has covered that. Are you prepared today to provide this committee with a list of those things that you as Commandant would prioritize in the event additional funds were allocated towards the Marine Corps by the Congress?

General KRULAK. Yes, sir, I am.

Senator WARNER. Could you share it, please?

General KRULAK. I can share it in a macro sense; I can provide it in detail.

Senator WARNER. We would suggest it both ways. Give us your best judgment at this moment.

General KRULAK. If additional funding were provided and my fellow service chiefs like to laugh at me on this, but the first thing I would get, I would spend probably between $10 and $20 million on what I call initial issue, taking care of the individual equipment of my Marines.

Senator WARNER. Upgrading the maintenance?

General KRULAK. No, sir. I am talking about things like rain gear that works, tents that do not leak, sleeping bags that do not weigh 40 pounds when soaking wet. So I would take care of that.

Senator WARNER. The very basic equipment.

General KRULAK. Basic equipment, sir, that takes care—you talk about quality of life, I am talking about taking care of my Marines.

Senator WARNER. In other words, in your professional judgment, that basic equipment—you have enumerated several items—is deficient, in your judgment?

General KRULAK. That is correct, sir.

Senator WARNER. It is a hazard to Marines performing their mission today?

General KRULAK. Sir, nothing hazardous to my Marines. I mean, they perform their mission. What I am saying is part of quality of life.

Senator WARNER. Your Marines could perform better if they had top-of-the-line equipment of a basic nature, beginning with tents and bunks and the like?

General KRULAK. That is correct, sir.

Senator WARNER. You feel that that is your top priority?

General KRULAK. If somebody came up and gave me a pot of gold, the first I would scrape off the top would be to take care of the individual Marine.

Senator WARNER. General, I think that is commendable, and I cannot imagine anybody considering it other than a commendable request.

Senator COHEN. How about some Maine-made boots?

General KRULAK. Sir, I will just share a story, and this is a true one. I had been nominated by the President of the United States to be the Commandant of the Marine Corps. I was the Commanding General of Marine Forces in the Pacific. I was in Korea. It was in late March, probably 33 degrees out, rain coming down, and I was standing on a pier at Pohang, Korea, flanked by a PFC on my left, a lance corporal on my right. All three of us were wearing the same field jacket that my father probably wore when he fought in Korea, except this one had camouflage on it. Water running down off of my cover over the bridge of my nose, soaking wet, and I looked at these two young Marines, and they were looking up at me, and you could almost sense them saying, and you are going to be the Commandant, and you are standing out here like this? At that point, it just became obvious to me that we had to do something for our young Marines.

I will say that the Congress of the United States helped a great deal last year. We got 44,000 sets of Gortex rain gear. I mean, we are wasting time here, but it is not a waste of time. You want to know what is important? That is important to me.

Senator WARNER. My time has run out, and I ask you to please supplement this answer with the details.

Senator COHEN. If you would yield, let him answer.

General KRULAK. Once I took care of that I would look very closely at some of the programs that I think are critical that are coming along, the V–22, our most important aviation program, the AAAV, I would look at the Javelin, which is a fire-and-forget antitank-weapon system that can reach out and kill to 2000 meters, top-down attack, tremendous system, particularly during the type of conflicts that I see, because it can be fired not only outside, but you can actually fire it from inside a building. Imagine what that will mean in fighting in urban terrain.

So there are things like that, sir, that we could use some help on.

Senator WARNER. Thank you.

10 seconds, Mr. Chairman, just to recount the reverse side of that coin. At about the time your father was in Korea I was there, and we had a better boot than the Army. The Army used to, at night, sneak into our area and steal our boots, because we had less frostbite with a thermal boot. So something has gone awry.

Senator COHEN. Those boots are from L.L. Bean. [Laughter.]

Senator COHEN. Senator Lieberman.

Senator LIEBERMAN. Thank you, Mr. Chairman.

General, I wonder if I could ask you to go back to the beginning of your testimony today and just expand for us what you see as the threats we are going to face that we are developing these programs in response to. You used a graphic expression which was "chaos in the littorals".

General KRULAK. Yes, sir.

Senator LIEBERMAN. Talk to us a little more about what you foresee. What kind of chaos in the littorals?

General KRULAK. Sir, I believe that there are very few countries in the world today that look at the United States and believe that they can beat us. Therefore, when they look at how to attack us, they will do it in a nonlinear manner, and they will not do it symmetrically, but they will do it asymmetrically. In other words, they will find our weaknesses and take advantage of those.

As an example, I believe that what we saw in Desert Shield and Desert Storm, the ability to move into ports and airfields, solid infrastructure, and believe that we will be left alone to do that in the 21st Century will be a bad mistake. Therefore, what we need to look at is how to reduce this nonlinear and asymmetric type of warfare.

That is why I think this committee is so important, because one of the ways you do that—and it is not because I am wearing this uniform. I would be saying this as a civilian. It has to do with not getting on land, keeping off of areas where you can be targeted, having mobility and in not being tied to logistics locations and communication nodes, because that is what you are going to get targeted.

They may not just target you with regular munitions. They may very well target you with some kind of chemical or biological agent. Therefore, you need to be in a position where you do not put your footprint on the ground, where you are not so dependent on land and what that brings to you in the ability to stage your forces.

I think that more than ever, seapower is going to be important; more than ever, all the services, not just the Marine Corps and its MPF, but I will speak up in behalf of my Army brethren, the Army and their afloat prepo. This is important to us because it in many ways takes away the capability of the enemy to really have an impact on us.

Senator LIEBERMAN. Let me take that overview, and then ask you to apply it to the littorals. What kind of vulnerability are you worried about there, in terms of the chaos you referred to?

General KRULAK. I am very worried about warfare in an urban environment. I think that in many ways we need to take a hard look at our tactics in urban environment. We fought the last time in an urban environment; in reality was during Hue City during Vietnam. Things have changed. Systems have changed. We need to experiment on how to operate the systems that we are buying most effectively in that type of terrain. So I see chaos in the urban areas.

Again, I mentioned the use of systems that are not what you and I normally look at as something that people would buy and utilize all the time. Chem/bio is a perfect example, and we need to be prepared for that eventuality. I think that you will see indirect fire weapons of great accuracy, but of not much cost. The same type of missile system of the scuds that we were concerned about in Desert Shield and Desert Storm will now be far more accurate and probably cost a heck of a lot less.

We need to be worried about an enemy—I mentioned the Chechnyan rebel—we need to be worried about an enemy who can take a very high-tech system, and by combining that high-tech system with something as simple as a VHS cassette training film that we make, package those two together and you turn this Chechnyan rebel into a killing machine.

Senator LIEBERMAN. Let me ask you about the response to that. Part of what you are describing to us today is of a new kind of response, which is the OMFTS program, operational maneuver from the sea. What are the three key changes that you see that are part of that program to deal with the new threat potentials?

General KRULAK. I think the first one is it is coming from the sea. We are ceasing to look at the coastline as a place where we stop, build up our forces, and build up our supplies, and then move inland. I do not think that type of warfare will suffice in the future. The first thing is sea basing.

The second is that you can pick and choose if you have the systems such as the AAAV and the V–22 and the LCAC. If you have those kinds of systems to come from well over the horizon, 20 to 25 miles, you expand the entire coastline that is open to you for you to maneuver against. So the ability to pick and choose your way through tough spots is far more available to you. So those systems allow you to make the initial penetration.

Then equally, if not most important, is that it is not just the initial penetration that is important. It is the penetration all the way to the objective area, which is, in fact, the center of gravity of the enemy. It does not necessarily have to be the enemy position or the tank formation or what have you. It can be a command and control node that, if you can get to, it you take away his center of gravity, you take away his ability to do anything against you.

All of that is a whole new different mindset of how we are going to fight in the 21st Century, and one that I think is critical.

Senator LIEBERMAN. Thanks, General.

Secretary Douglass, let me ask you to comment on this: There is a national research panel Naval Studies Board study out that estimates the need to spend another $20 billion over the next 20 years to adequately implement the OMFTS program. Does that sound like a reasonable number to you? Have you seen the study?

Mr. DOUGLASS. I have not seen the study, sir. I am familiar, however, with the Naval Studies Board. As a matter of fact, I gave a speech to them yesterday trying to help them through a study they are doing for us on where technology will go for the Navy and the Marine Corps in the next 50 years. I am not familiar with the number of $20 billion for Operational Maneuver From the Sea. But if you were to add up all the amphibious ships, the AAAV, the V–22 and so on, I would guess that figure would be much more.

Senator LIEBERMAN. Perhaps I would ask you to take a look at it when it comes across your desk, and then to comment for the record on it. Thank you.

[The information referred to follows:]

The study "Navy and Marine Corps Regional Conflict in the 21st Century" has identified $20B necessary to fund the Operational Maneuver From the Sea (OMFTS) concept weapon and non-weapon capitalization. The non-weapon category of the study, includes Command and Control, Ship's Fire Support Systems, Aircraft Targeting Pods, Logistics Systems, Mine Clearance and Non Lethals, requires about $14B. The study's weapons capitalization requires $6.5B to acquire 60,000 Guided Weapons. I agree with these numbers from the Naval Studies Board, however, one must consider our supporting efforts for OMFTS which also include Amphibious Ships, AAAV and V–22. These costs are $12.4B, $7.6B and $39.2B respectively. Therefore, more accurately, approximately $80B for acquisition of all weapon and non-weapon capitalization would be required to support OMFTS over the next 20 years.

Senator COHEN. Thank you, Senator Lieberman.

Senator Smith.

Senator SMITH. Thank you, Mr. Chairman.

General, if I could just follow up on your quality of life comments. I must say I was somewhat shocked to hear your comments. I forget the number. What did you say, $10 million?

General KRULAK. $10 million got us 44,000 sets of Gortex, some boots, yes, sir.

Senator SMITH. What about housing for the ordinary Marine corporal? How are the housing needs throughout the country at the various bases?

General KRULAK. I would obviously not be forthright if I told you that all of our Marines are billeted in homes that I am happy that they are in—and that is not just married, that is also my bachelors.

We are working very hard. As you know, thanks to the Congress of the United States, we got some plus-ups and we are building three BEQ complexes out in California, we are building 54 homes in Hawaii this year, we are making progress. Are we making it to the degree that, as the Commandant of the Marine Corps, am I satisfied that I can look each individual Marine in the eye and say I am really taking care of you? I do not think I can. I do not think any of the service chiefs can.

Within the context of the program, I believe we are doing as good a job as we can possibly do. We are putting money against BEQ's, we are putting money against family housing.

Senator SMITH. Well, I do not want to have you compromise your budget discussions, but let me just make an assumption. My assumption is that you requested ample funding for your men and women, is that not correct? Is that a fair statement? In your request, did you ask for enough dollars to cover the shortfalls that you have outlined here?

General KRULAK. I think I am missing your point, sir. Absolutely, our budget does not—does not solve all of the shortfalls in BEQ's and housing. If we went after that, we would literally——

Senator SMITH. Well, when you made your interim request to DOD, did you request more funding in this area than you received?

General KRULAK. We are given the top line, Senator, and we—my responsibility is to build a program within that top line that meets my operation and maintenance, my manpower, my procurement, quality of life, et cetera. So based on that top line, I have done the very best I can.

If your question is if there is more, if the line was higher would I be able to do more, the answer is yes, sir, I could.

Senator SMITH. That is essentially the question.

Let me move to another subject and ask you a question, Secretary Douglass. When the Commandant spoke at another hearing, I asked him about the prepositioned force. He indicated they were very much needed, and that there would be an additional need for the second ship. If the Commandant wishes to comment on it, he can, but he made the point on that. The question I have is how do you feel about the second ship? Do you support it, number one, and number two, if additional funds are provided through the congressional authorization, would you support that authorization and appropriation?

Mr. DOUGLASS. Sir, when the Commandant identifies equipment requirements and those requirements are a part of the Department's program, I do everything I can to try to acquire them for the Corps for the lowest possible price. In this particular case, it is my understanding that we have been given the authority by Congress to procure one ship, but there was some clear evidence that there was a requirement for more than one ship. What we have tried to do in this first procurement was to ask for a bid for the first ship, and ask for the people that are offering those bids to give us an option for a second ship.

This is a deviation from our normal policy, because we normally do not ask for bids when we have not already received an authorization and an appropriation, but in this case it seemed as though there probably would be a requirement. So we let the bidders give us a voluntary bid for a second ship. Those bids are out now, and we should get them back in the near future. When they come in, this would allow me to notify you and others in the Congress as to what the price would be for a second ship.

Senator SMITH. Does a multiship deal save you money?

Mr. DOUGLASS. Yes, sir, it does.

Senator SMITH. How much? Do you have any idea?

Mr. DOUGLASS. It is hard to say in the particular instance, because it varies from shipyard to shipyard and from deal to deal. As you know, we are talking about conversions, not new construction, and sometimes builders can get two or three at a crack, and others can only get one. But in general, if you can buy things in quantity you can save. That was my rationale for being able to get that second bid. I hope to be able to let you know how that stands in a few weeks when we see where we are.

Senator SMITH. Speaking personally, as one who has long espoused getting those ships in place, I appreciate your support on that very much, and your willingness to help try to get them funded in the budget.

General KRULAK. Sir, could I add—I cannot pass up the opportunity—I was honored during Desert Shield and Desert Storm to be dual-hatted. One of my commands was the 6th Marine Expeditionary Brigade that, in fact, fell in on the MPF, and the importance of that capability to the Nation was proven during Desert Shield and Desert Storm, and would certainly be proven again if we had anything like that.

The one point that I wish I had made the last time I was in front of this committee was that not only is it useful for the original and the initial introduction of forces into the war, but equally if not more important, that ship reverts to what is called common user lift, and goes right back and can be utilized to pick up Army or Marine forces. It is not something that once it offloads it just sits out there. It is a two-for. You get the original and initial entry into the war, and then you have a common user for the rest of the conflict.

Senator SMITH. Do you support the current end-strength of 174,000?

General KRULAK. Absolutely, sir.

Senator SMITH. If you go below it?

General KRULAK. We are—and I know that there are those who probably cringe when I say it, but I will tell you, sir, with the strategy that is currently being employed and with what we see coming in the future, 174 is critical not only for the Marine Corps but for the country.

Senator SMITH. Thank you very much, Mr. Chairman.

Senator COHEN. Thank you, Senator Smith.

General Krulak, you probably recall the movie "The Graduate" that was made some years ago where the secret of a young man's success was said to be in plastics. It seems to me that when you respond with what would you do as one of your highest priorities for your future, it is Gortex. I am not making light of this, but it seems to me that this is a problem we must confront. It is very hard for a Marine or any other soldier to have a steady aim when he has got cold feet or is drenched and soaked with rainwater. It brings to mind that on the one hand we have had contingency operations funded—I think it was 2.8 billion—in fiscal 1996. We put another $1.1 billion in fiscal 1997 for contingency operations, and obviously, you had to make some changes on the margin, to say the least, in order to take it out of various programs you otherwise would fund.

One of those programs would be quality of life for the Marine Corps in the form of Gortex or boots or chemical weapons defensive equipment, defensive equipment, which we have not talked about today, in addition to the AAAV and to the AV–8B upgrades, which we will get into in a moment.

But before I deal with that, I have a problem in terms of your statement about we have to modernize our minds. How modern does it have to be? I could go back to the writings of Sun Tsu. Basically, the enemy is always looking for your weakness and studying where the deficiencies are and to strike there rather than going head on against you. So it seems to me that we do not have to look into the future in terms of modernizing our minds. We already have a Chinese warrior philosopher as such talking about ways in which we exploit the weaknesses of the enemy.

It seems to me that one of your greatest—not greatest fear, but one of your fears would be that of a Chechnyan rebel who has been armed, heavily armed, and he is going to turn into a high-tech killing machine. How does a Chechnyan rebel who has been given high tech equipment differ from a SPETZNAZ soldier that we had to contend with during the Cold War?

General KRULAK. With all due respect, sir, I would probably have a slight disagreement with the Senator in that I think that in linear warfare we saw the matching of tank against tank, artillery piece against artillery piece.

Senator COHEN. We are not talking about the Civil War, now, and we are not talking about World War I. We are talking about today and tomorrow.

General KRULAK. Yes, sir. What I am saying is that we are pulling out of a situation where you had two world powers aligned against each other. My point is that we have seen the disintegration of that, and we have seen, instead of state actors where you have crises evolving, crisis being what we saw in Cuba, a crisis being Taiwan and China vis-a-vis what I am talking about as nonstate actors in chaos, which is seen in the Hamas in Israel, the tribes, the warlords in Somalia, and sir, that is what I am talking about.

There are going to be requirements, please understand, for major formations. We need the chain mail fist of American diplomacy. My point is we also are going to need something that is out there, naval forces that are going to be managing the kind of instability that will be the forerunner of what might be a major conflict.

Senator COHEN. If one of your goals is to win with some sort of an operational maneuver from the sea rather than putting a footprint on land as such, why would not an enemy understand that we have a superior capability, technological and perhaps tactical, and simply wait for you to come ashore? Why would they want to contest you at sea, if that is where you hope to have operational maneuver superiority?

General KRULAK. First because he does not know what my goal is going to be. My goal is going to be his center of gravity. It may not, in his mind, be in fact his center of gravity.

Two, the expanded battlefield is going to be such that for him to deny or attempt to deny the totality of that battlefield will stretch him to the point that it will make our job a lot easier. That is the whole concept of extending operational maneuver from the sea, because you do have that advantage on him.

Senator COHEN. You mentioned the AAAV as being one of your top priorities, and I assume that is an essential ingredient as far as actually getting the operational maneuver from sea. What are the results you have so far of the testing of suspension components, prototype engines, weapons stations, radio integration that you have been conducting the past 2 years? Where are we? Has there been a demonstration validation test?

General KRULAK. Yes, sir. We have had testing on automotive test rigs that have been extremely successful. We are talking about a capability of a vehicle to go three to four times the speed of our current vehicle, that once it hits land has the maneuverability of an M1A1 tank, that has twice the armor protection of the current system that we have when it has its reactive armor on it, and it has a chemical and biological overpressure for not only the crew but all the individuals that are in that system.

So we are talking about a tremendous capability that has, in fact, been tested on the water and has the automotive test rig on land. The engines are performing well. We are very satisfied with the way it is coming along, sir.

Senator COHEN. Do you have plans or requests to accelerate the deployment or fielding of this system by a year?

General KRULAK. Sir, in answer to Senator Warner's question with regard to what would we do if we had some extra money, if we had the extra money we believe we could, in fact, accelerate by at least a year, yes, sir.

Senator COHEN. Maybe, Secretary Douglass, you might comment. Are there any tradeoffs in terms of attempting to accelerate 1 year that you might find some operational difficulties that will be compromised?

Mr. DOUGLASS. I do not think so, sir. I do not know of any operational capabilities that would be compromised. Several years ago, the program was slowed down by taking some money out of the program, and subsequent to that, we speeded it back up again by adding some funds. If we could add more funds, we could accelerate the program further.

Senator COHEN. So, in your judgment, there would be no technical risk and it would make better economic sense to try to accelerate it under those circumstances?

Mr. DOUGLASS. I do not think the risk to the program would increase substantially if we made a modest acceleration.

Senator COHEN. Senator Robb.

Senator ROBB. Thank you, Mr. Chairman.

Let me just follow up for one second on the AAAV. I had, courtesy of the distinguished liaison representative for the Marine Corps, an opportunity to go out and test drive that, at least the automotive side, up in Maryland about a year or so ago and was pleased with the progress that we are making.

But with respect to the kinds of transportation that Marines would use to get from their position over the horizon through the littoral, the AAAV is the only remaining link that really requires a fairly sophisticated mine removal. The LCAC can certainly detonate them but the Osprey and helicopters, and what have you, are not really concerned about that. Indeed, mines were a factor in some decisions that were made in Desert Storm as to whether or not we ought to send that embarked-amphibious contingent, otherwise clearly ready to fight, into the battle.

I guess the way to ask the question is, are we placing enough emphasis or do we have the current capability, in your judgment, with respect to mine clearance so that we can make some passage for the AAAV when it comes ashore or should we be spending more of our time on the other means of leapfrog technology.

General KRULAK. Sir, let me first be very up front. I do not believe that at the current time if we had the AAAV that we have all that is necessary to go through an area that we know has mines. Probably one of the things that I know Mike Boorda and I feel the proudest about is the ongoing development of what is called the N–85. Major General Jim Jones has the position right now as the N–85. It is expeditionary warfare within the OPNAV staff. They have got a mine warfare plan in CONOPS that goes with that mine warfare plan, that if we continue to push and continue to fund it the way it is currently being funded, I believe that when the AAAV reaches its IOC, that we are going to have the capability to do what needs to be done.

That is going to require a commitment on my part to do something that has not been done before, and that is to maintain some continuity for the general officer in that very critical position. We have not done well on that and there are a lot of reasons why, but none of them suffice. So, I have talked with Mike Boorda.

We are bringing in an officer, a general officer, who has served with Mike before when Mike was in Europe, and he is coming there and he is not going to leave. He is going to stay there and provide the continuity that we so desperately need in that particular area.

Senator ROBB. Well, the CNO has certainly has certainly marked out his interest in that area and hopefully will make some of the progress that you are looking for.

Let me ask you another question that has come up a time or two. Obviously you think about it, and that is our forward basing. If the Marine Corps is going to be the 911 force, clearly, it has to have the forward basing, not only seaborne, but some additional significant land-based forces.

The area that obviously has been under intense scrutiny of late has been Okinawa. I wonder if you would comment, putting aside the politics of the situation—that is something that is going to have to be dealt with at a higher pay grade—with respect to the Marine Corps' ability to meet its contingencies in and around the region. Are there alternatives to a complete continuation of the status quo that you have examined and found acceptable, or should we put, essentially, all of our eggs in the basket of trying to hold on to what we have in lieu of some possibility of alternatives with Guam or anyplace else that some of those forward-deployed forces might be stationed?

General KRULAK. Yes, sir, I have given that a lot of thought. Again, I will not get into the politics because, as we know, the Commander-in-Chief is on his way to Japan and anything I might say to damage his efforts over there, I would certainly not want to do.

Senator ROBB. Indeed, according to the Japanese Ambassador to the United States, that will be on the agenda and there will be some announcement about it.

General KRULAK. Yes, sir. What I think, again, goes to the day after tomorrow. I think that if we really, and I believe we all probably do accept that the economic center of gravity for the world is going to be shifting toward the Pacific and if you look at the requirements of Persian Gulf oil coming out of the Persian Gulf into the Indian Ocean, looking at the Straits of Malacca and the criticality of the Straits, and then looking at going up the coast to Vietnam, China, Japan and Korea, you will see, in my opinion, the fulcrum of that entire area is in fact the Straits of Malacca.

So, where we go in the 21st Century as a nation seeking places to locate U.S. Forces, if it were Chuck Krulack, I would look to the fulcrum because I think the key is going to be in that area. Right now, about 48 ships a day pass through the Panama Canal, 50 a day through the Suez, in excess of 200 a day through the Straits of Malacca. Where are they coming from and where are they going?

They are fueling this tremendous expansion that is taking place in that area. Maybe not now, maybe not 10 years from now, but sooner than later, I think we need to look strategically at that area and see if we could get some kind of agreements that would allow our ability to operate somewhere in that vicinity. I think it would make good sense. That is personal opinion.

Senator ROBB. I think it is clearly one that is going to have to remain on the radar screen for some period of time and it has a lot of other implications.

One final question, if I might, Mr. Chairman, on this question of how we get our Marines and soldiers, sailors, airmen, whatever, to the place where we are going to have to put them directly in harm's way, the longer haul, not the intercontinental, but shorter hauls, the C–130 has been a workhorse for us, for the Marine Corps, for a very long period of time.

General Fogleman, in his testimony, suggested that if he had a little extra dollar, if he had that pot of gold you referred to earlier, I think number 9 on his list would be getting six of the C–130Js. Most of the rest of the fleet is getting a little age on it, including most of the ones, as I understand it, that we have available to us.

Is that another area that you would like to see a little plus-up if we had the dollars available?

General KRULAK. Yes. We are obviously watching very closely the 130Js. Approximately 50 percent of our 130s are currently over 30 years old. Another large chunk of them are around 20. We are proud to say that the newest C–130s we have are in the reserve part of our total force. The J has got tremendous capability. It moves faster, longer range. You have got night vision, goggle capability within the cockpit. It has the capability to refuel that the current 130s do not have, a far more sophisticated capability. So, obviously, we are looking at it but it is not in the program, sir.

Senator ROBB. Mr. Chairman, there are obviously more questions. We will have an opportunity to continue this discussion, but I think it has been very helpful and I appreciate it.

Senator COHEN. Thank you, Senator Rob. I should indicate once again for the record that Senator Kennedy is on the floor with an amendment and he wanted me to extend his sincere apologies for not being able to be here to participate in this hearing.

General Krulak, you have emphasized a number of times the importance you place on the V–22, and you singled this program out as one of your highest priorities.

A couple of questions. My understanding is that this program is in the LRIP, the low rate of initial production.

General KRULAK. Yes, sir.

Senator COHEN. Why are you of such an opinion that it is at a stage sufficient that it would warrant additional incremental funding at this point, and what increase in funding and quantity would you envision that would make sense to you?

General KRULAK. Yes, sir. This aircraft, although it is in LRIP, has gone through extensive testing. It has over 1,000 hours right now of flight time. It has performed in innumerable tests. It has really met and/or exceeded our expectations. It is coming in approximately 500 pounds below weight. It is able to go faster. The direct coefficient is less than we anticipated, and so we believe it is pretty well mature from the LRIP standpoint.

Obviously, it is still not totally tested and evaluated. Again, my view was within the current program we are basically doing the best we can. It is an issue of if there were more funds available, we would obviously like to see it accelerated to a degree. We have been very up front with Secretary Douglass, who has been very helpful in looking at this issue.

John, do you have anything?

Mr. DOUGLASS. We have looked at it, sir. The real money to be made in the acceleration of the program is in the outyears and getting the production rate up. Again, it is an affordability issue. But there are some other things we could do, multi-year procurements for example. I plan to implement those techniques to save funding which we would hopefully be able to put back in the program to buy more airplanes sooner.

Senator COHEN. What amount makes good, sound business sense to you?

Mr. DOUGLASS. Sir, we are in low rate initial production, there are four this year in the plan. I would not go much higher than six. I am just not sure the capacity exists there. But the money is in the outyears.

Senator COHEN. Is it a funding or technical issue at this point?

Mr. DOUGLASS. It is a funding issue, sir.

Senator COHEN. Mr. Secretary, are you aware of the controversy that seems to have arisen, at least in the trade press, about disagreements between the Navy and Special Operations Command over the development of a Special Operations version of the V–22?

Mr. DOUGLASS. Yes, sir, I would not characterize them as disagreements, Senator. Basically, what happened was that we have a certain amount of money in the budget for the Special Operations version. When the bids came in for that bird, they were substantially higher than the money that we had in the budget.

So, we had to go through what we call a factfinding process in the acquisition business in which we got the Special Operations Command, the Program Office people and our contractor together. We went through all of the options. It is my understanding that we generally agree on what would be a reasonable program for the Special Operations Command for the CV–22.

Senator COHEN. My understanding is that the Special Operations Command is questioning whether the aircraft would be deliverable on time and in a configuration that would be of use to the Special Operations Command itself.

Mr. DOUGLASS. That has been one of the subjects that we discussed on the way to the hearing today. I was talking to representatives from the Special Operations Command, and they told me that they felt we were very close in working out this issue and that with some very minor adjustments to the program in the next fiscal year or two, they think we can see our way through a successful program for them.

Senator COHEN. Any possible link between problems associated, or disagreements, whatever word we want to use, between the CV–22, is there any linkage between that and the Marine Corps version, the MV–22?

Mr. DOUGLASS. I do not think so. The Commandant and I are working this pretty closely together. We are keeping a very close eye on the basic program because it is so important to the Marine Corps and the Navy. I would say he and I are in total sync on this. As a matter of fact, we have a meeting planned in the near future to make sure that we know where we are going on the basic program.

But I do not see any serious linkage at this time but I am keeping a very close eye on it, Senator, because this is one of my most important aviation programs. I spend quite a bit of my time on this program.

Senator COHEN. Mr. Secretary, a moment ago you mentioned multiyear procurement might be at least one of the answers for the V–22. What other programs do you envision could benefit from a multiyear procurement similar to what you recommended on the AEGIS destroyer DDG–51 program last year?

Mr. DOUGLASS. In the Marine Corps, obviously, the whole panoply of their major systems have potential for multiyear procurement. Eventually, after we get through the source selection and low rate production on the AAAV that is a candidate. We are well launched on the AV–8B remanufacture program and there may be some potential there.

Senator COHEN. Stop right there because I want to ask you about, GAO apparently does not think that is such a wise decision as far as the remanufacture option on the AV–8B. Have you looked at that?

Mr. DOUGLASS. Yes, sir, I have seen that. It is a classic discussion about what percentage of savings you could get out of a multiyear procurement before you go into it. I think reasonable people can differ on that and in the financial situation that we are in today, frankly, even small percentages of savings are awfully hard to turn down, would you not say, Commandant?

I mean, a few years ago we scoffed at savings at 5 or 6 or 7 percent and we said we will not do it unless we get something higher than that. But in today's financial environment, there is a very serious effort to go after any savings we can, and we are looking at that program.

Senator COHEN. Last year, we added money for the program in order to get higher numbers at a more efficient rate and we expected to see at least a request for 12 in this year and we only found 10. What is the explanation? Budget again?

General KRULAK. Yes, sir.

Senator COHEN. Let me come back to another favorite subject of ours, the arsenal ship. General Krulak, you have heard Admiral Boorda testify before about this, and during the past year, there has been at least some notional development or conceptual talk about an arsenal ship and Admiral Boorda apparently believes the arsenal ship could supply the high volume, sustained accurate kind of ship-to-shore fire support that now the only the inactive battleships can possibly provide.

So, the question I have, number one, is what specific capabilities would the arsenal ship need in order to satisfy your requirements?

General KRULAK. First of all, I applaud Mike Boorda for trying to solve a problem that I think the Navy and the Marine Corps have recognized we have had for some time, and that is lack of naval surface fire support, and that is not just for the Marine Corps, but it is also for Denny Reimer and the Army. I mean, they need it just as much as we do.

The arsenal ship, in my opinion, has a couple of things that are very positive about it. One, it is not going to cost too much. That is a positive.

Senator COHEN. I have heard that before. Mr. Edsel might have something to say about that. Okay, it is not going to cost very much, number one. What else?

General KRULAK. Second, it is going to be out there and not come home. If we operate it the way we think it is going to be operated, the system will basically remain in the trouble spot very similar to what we see with our MPF flotillas in that the crew may be rotated but the system will be out there.

As far as I am concerned, as a Marine, to know that that is out there, that when the 911 call goes, I not only have the Marines out, but I have my fire support ship. That is, to me, critical. So, when we talk about the ability to stay and not come back, that is very important to me.

Three, if we can, in fact, get the VLS tubes and the systems in those tubes that can achieve the accuracy that I think we can get, then I believe that in a range of anywhere from 60 to 90 miles inland with good accuracy, we have got ourselves a heck of a system, sir.

Senator COHEN. Secretary Douglass, you testified about this a few days ago and talking about building this from off-the-shelf technology, a mix and match of capabilities, and we talked about the Block 3, Block 4 Tomahawk, the Army's ATACMS, in addition to the 5-inch gun.

General Krulak, can you comment about whether or not you can actually take the existing ATACMS and the Block 3 and 4 Tomahawk without the need to modify these missile systems in order to be aboard this ship? We have heard conflicting evidence of this. There is some disagreement as to whether or not you can just take and build this car kit, so to speak, and you put it out there and you can take whatever we have got in the inventory now and make a few minor upgrades on it and stick it aboard that ship and put it out at sea and we have got a floating ammunition dump that can go anywhere in the world.

I will talk about its targetability later, but it appears to me that if you have a ship with this capability on board, that is going to be a prime target for the next enemy we have to contend with to take out and preventing this from happening is always a challenge.

But are both of you gentlemen saying that you could take existing systems, put them aboard this conceptual ship without the need to engage in multimillion dollar modifications of the missiles that we currently have and that this can take place?

Mr. DOUGLASS. Sir, the objective would be to make as few modifications as possible. There is some concern about if ATACMS will come out of a standard Tomahawk or Standard Missile vertical launch tube. The technical descriptions that people have given me are that they think it is feasible but it could be extremely tight.

Using off-the-shelf systems is our objective to the maximum degree possible. I could not rule out that we will not have to do some modifications to do this, but I would hope that those could be held to the minimum, sir, and that is the design approach.

As I mentioned in my earlier testimony, I used the example of the F–117 where we used existing engines and existing cockpits. Basically everything except the exterior of the airplane was from existing programs.

But, we did have to modify those things. For example, you have to modify the engine to make it fit inside a new airframe and you do have to modify some of the cockpit components. However, those modifications were minor, and they saved us a lot of money and time, and we did not have to start all over.

What I meant to portray was we are going to try to build this ship around things we knew we would have in the inventory so we do not have to invent the rockets and missiles that would be shot.

Senator COHEN. That is the way the C–17s started out, is it not?

Mr. DOUGLASS. Not to my knowledge, sir.

Senator COHEN. Taking existing technology——

Mr. DOUGLASS. The C–17 got started, as you know, many, many years ago.

Senator COHEN. I was there at the takeoff.

Mr. DOUGLASS. Then it got cancelled; then it was resurrected again, and so on.

Senator COHEN. But there was this notion we just take existing technologies, we take a little piece here, we have long legs versus the short legs, we have a merge of a different type of fuselage and we will get exactly what we need to take an aircraft that can land at hard-to-get areas of the world, and it has been a long road. I think that started way back in maybe 1979 or 1980.

Mr. DOUGLASS. Before that. Way before that.

Senator COHEN. That is when I came into it. They were still, at that point, in the design phase.

Mr. DOUGLASS. Sometimes these things work, and sometimes they do not, sir. But we are going to try to hold down the invention costs. We are going to try to do it with what we call "skunk-works" techniques.

For example, we would not envision this being run where the management team is located here in Washington. We are going to put the management team with the contractor to minimize communication and travel time, and so on. We are going to try for a very aggressive schedule to get the first ship in the water by the year 2000. This first ship will be a prototype. If what we have looks like it is going to have significant payoff for our warfighters, we would then have the contractual means to buy four or five with fairly firm options.

Senator COHEN. Apparently we are going to hear some testimony sometime this week. One suggestion is to take our submarine force and give it an arsenal ship capability, which should be fairly interesting to contemplate.

General Krulak, before I do that, get to that issue, are you satisfied with the conceptual or notional idea of this arsenal ship when combined with the 5-inch guns. Is that going to give the Marine Corps what it needs?

General KRULAK. I am satisfied, sir. I have talked to Mike Boorda about this. I think, and probably following along your lines, I think this is one of those that we have got to really work out. You cannot just say, I am going to put ATACMS on there and fire it. I mean, that is the type of experiment that, in my opinion, fits, and I think Mike feels the same way, into Sea Dragon. How do we employ this system off of a ship and how do we make sure that it works?

The same with the electrothermal capability on the 5-inch 54. I had some people in and describe to me the technology that surrounds that and they are very confident that this can happen and that they can extend the range. I think we just need to work with it a little bit and I think that that is what Mike is also feeling.

Before we put a bunch of tubes in a ship, I think we both feel the same way you do, that we have got to get it out there and experiment and make sure that it does work.

Senator COHEN. In the meantime, what do you have for ship-to-shore fire?

General KRULAK. We are looking at the extended range 5-inch 54, and I agree with you, sir. I think we all feel the same way. You talk to Major General Jones and he would say the same thing, that we have got concerns.

Senator COHEN. Javelin missile. Is that a candidate for additional funding if Congress decides to come up with it?

General KRULAK. Sir, Javelin is a great system. I described it in some detail but we are talking about a system that can be fired in a house, outside, 2,000 meter range, fire and forget. The kid does not have to track it. It is a top down so that even the most heavily armored, you are hitting the system where it can destroy it. I think it is a great capability. We are getting—this is the first year we are buying. We are buying about, I think it is 64 of the control units, 128 of the missiles. So, this is a big year for us. This is a special time.

Senator COHEN. Amphibious lift shortfall. Do you want to comment on that and what we can do to fill the gap?

General KRULAK. Well, sir, I think, to be very honest, you all have done more than we could have ever expected. I think what happened last year will have a major impact on the world, that at least this one Marine sees in the 21st Century. I think that the goal of 12 big decks supported by 12 LPDs and LSDs is going to give the Nation a tremendous capability.

I think Mike Boorda and I both feel, and I am sure Secretary Dalton and Secretary Douglass feel the same way, as quick as we can get there, we want to get there. It is what we are about. It is the forward presence—that, plus the carriers, is what this Nation has on a day-in, day-out basis, out there doing the job.

Senator COHEN. All right. Well, Secretary Douglass and General Krulak, we appreciate your coming here today. Your testimony was very helpful.

General, at some future time, in the event the President's trip does not prove to be completely fruitful, I think we might like to have a sealed letter of the options that you have in mind presented to us for a private review.

General KRULAK. Certainly, sir.

Thank you so much, sir, for this opportunity.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JOSEPH I. LIEBERMAN

CH–53E

Senator LIEBERMAN. General Krulak, I note that the OSD Comptroller recently released funds from the fiscal year 1996 Authorization Bill to procure two CH–53E helicopters. Am I correct in my understanding that the Marine Corps Reserves are still short a significant number of CH–53Es? Am I also correct that the Marines have been very pleased with the performance of the CH–53E? If Congress were to authorize and appropriate additional funds to Marine Corps programs, would you want additional CH–53Es for the Reserves?

General KRULAK. Senator Lieberman, you are correct. The Marine Corps Reserves have a requirement for sixteen (16) CH–53E "Super Stallions". Yet, we currently have only four (4) CH–53E's under contract in support of this initiative. Two (2) of these helicopters were funded with APN–1 dollars in fiscal year 1995 and two (2) were funded via the fiscal year 1996 National Guard and Reserve Equipment Account. Senator Lieberman, we are extremely pleased with our fleet of Super Stallions and plan to keep them in service for another 20 years. This is our last aviation "mirror image" initiative to give our reserve units the same equipment their active counterparts operate and if Congress were to authorize and appropriate additional fiinds to Marine Corps programs, we would want to procure additional CH–53E's for the Marine Corps Reserves.

MINE COUNTERMEASURES PROGRAM

Senator LIEBERMAN. Mr. Douglass in your prepared statement you expressed concern that the threat of mines can "dramatically reduce the tempo of our operations." Given the significance of this threat, to what extent are you satisfied with the level of resources currently being applied to the mine countermeasures program? In last week's hearing on this subject, we were told that the Magic Lantern system is performing superbly, and will soon be deployed with the fleet. Do you share this enthusiasm for magic Lantern and, if so, should we consid.er procuring more of them sooner?

Mr. DOUGLASS. First, with regard to the level of resources currently being applied to the mine countermeasure program. Mine countermeasures has received considerable attention over the past 4 years, thanks to continued interest by the Congress. This year, Navy submitted a revised Mine Countermeasure (MCM) Master Plan which highlights known shortfalls in our ability to perform the MCM mission and specified the steps required to eliminate those shortfalls. This Plan also focused those efforts required to provide an organic MCM capability with our deployed forces rather than concentrate our efforts in a centralized MCM force. The program outlined in this year's plan is aggressive and will require a concerted effort by Navy leadership to ensure that its goals are met. A critical part of the staffing of this year's MCM Plan was the "certification" that resources were programmed into the budget to support the Plan's execution. I am satisfied that sufficient resources are being applied to this problem. However, the successful administration of this program will require top-level commitment to maintaining the budgeted resources at the current planned levels.

Second, it is too early to commit to the procurement of additional Magic Lantern® systems at this time. The success of the system to date is promising but extremely limited. Magic Lantern® passed an operational assessment in September 1995. This test was a required reevaluation to demonstrate resolution of significant false alarm problems which caused the system to fail the initial operational assessment.

In fiscal year 1996, Navy is planning to procure its third Magic Lantern® system and is modifying five SH–2G helicopters to host the systems. These units are being assigned to a Reserve squadron which will evaluate the operational rigor, maintainability, supportability, operator suitability, and tactical utility of the Magic Lantern® system. The Reserve squadron will provide the Navy operational forces a contingency mine detection capability if required in times of crisis.

Magic Lantern® is a registered trademark of Kaman Aerospace and is one of several potential competitors to meet the requirements of the Airborne Laser Mine Detection System (ALMDS). The Navy intends to compete the procurement of ALMDS in order to provide the most effective system at the best price. Funding and acquisition schedule for ALMDS are to be determined as part of the fiscal year 1998 budget development process.

[Whereupon, at 4:15 p.m., the hearing was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1997 AND THE FUTURE YEARS DEFENSE PROGRAM

WEDNESDAY, MARCH 27, 1996

U.S. SENATE,
SUBCOMMITTEE ON SEAPOWER,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

DEPARTMENT OF THE NAVY'S SUBMARINE DEVELOPMENT AND PROCUREMENT PROGRAMS

The subcommittee met, pursuant to notice, at 1:30 p.m. in room SR–232A, Russell Senate Office Building, Senator William S. Cohen (chairman of the subcommittee) presiding.

Committee members present: Senators Warner, Cohen, Robb, and Lieberman.

Committee staff members present: Romie L. Brownlee, staff director.

Professional staff members present: Steven C. Saulnier.

Minority staff members present: Creighton Greene, professional staff member.

Staff assistants present: Patricia L. Banks.

Committee members' assistants present: Judith A. Ansley and John H. Hoggard, assistants to Senator Warner; Dale F. Gerry, assistant to Senator Cohen; Ann E. Sauer, assistant to Senator McCain; Samuel D. Adcock, assistant to Senator Lott; Thomas L. Lankford, assistant to Senator Smith; Patricia L. Stolnacker, assistant to Senator Santorum; Andrew W. Johnson, assistant to Senator Exon; Steven A. Wolfe, assistant to Senator Kennedy; John P. Stevens, assistant to Senator Glenn; William Owens, assistant to Senator Robb; and John F. Lilley, assistant to Senator Lieberman.

Committee members' fellows present: CMR Michael J. Matthes, fellow to Senator Warner; CDR Thomas A. Vecchiolla, fellow to Senator Cohen; Craig B. Williams, fellow to Senator McCain; Brian Levengood, fellow to Senator Santorum; Randy A. O'Connor, fellow to Senator Kennedy; Ninetta Sadusky, fellow to Senator Robb; LTC Michael W. DeYoung, fellow to Senator Bryan; and Stanley Kauffman, fellow to Senator Lieberman.

OPENING STATEMENT OF SENATOR WILLIAM S. COHEN, CHAIRMAN

Senator COHEN. The subcommittee will come to order.

Senator Kennedy will be here shortly, but we will proceed in his absence for the time being.

Gentlemen, let me welcome you. We have some important matters to discuss today. Last year, this committee and the House National Security Committee engaged in a very lengthy conference. The future of the Navy submarine program was one of the central issues that contributed to the duration of that conference, and it is important that the Navy have an opportunity to explain its goals for submarine procurement as fully as possible.

I might point out, if you find that any of the questions that I ask today miss their mark in your judgment please let me know, and do not hesitate to point out what amplification is necessary.

Admiral Lopez, you play a crucial role in both the assessment of the Navy's capabilities relative to requirement and the allocation of resources to resolve any disparities. You have appeared before this subcommittee on several occasions. I think it is fair to say, at least in the judgment of the committee staff, that you are not a candidate for the William Jennings Bryan award for flights of rhetoric.

As a matter of fact, it has been suggested to me that Calvin Coolidge is more of a role model for you, that you follow old silent Cal.

Senator WARNER. Well, here is noisy John, just arrived. [Laughter.]

Senator COHEN. The loquacious John Warner. You are also not a submariner with a community's future institutional bias, if any, riding in your back pack, and so we look to you for an evenhanded, candid, and complete coverage of requirements.

Secretary Douglass, I think I have seen more of you in the past 2 weeks than I did in the entire 3 years that you were on the staff. I would not offer reticence as being one of your noble characteristics or personality traits, so I am confident that you will give us a full exposition of your views.

Let me say at the outset that the Secretary of Defense's report on nuclear attack submarine procurement and technology arrived only last night. We have not had an opportunity to review it in detail, and I am hopeful that you might be able to expand on it in your presentation this morning, or this afternoon.

We will be pleased to hear any opening remarks you care to make. As you know, we place a premium in this subcommittee on brevity and cogency, and your full statements will appear in the record. If you could summarize, that would be very helpful.

Secretary Douglass.

STATEMENT OF HON. JOHN W. DOUGLASS, ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH, DEVELOPMENT, AND ACQUISITION, ACCOMPANIED BY VICE ADM. THOMAS J. LOPEZ, USN, DEPUTY CHIEF OF NAVAL OPERATIONS

Mr. DOUGLASS. Yes, thank you, sir.

Before I begin, sir, with your permission I would like to enter into the record Admiral Lopez' and my joint statement. In addition I have a letter to you from Secretary Dalton which we would ask that you place in the Congressional Record and the hearing record. It is a letter that expresses our deep regret and sadness with the passing of Dave Packard yesterday.

We felt this was a fitting occasion for me to do this as the Navy's Acquisition Executive, in recognition of all of the contributions that Mr. Packard made in the areas of acquisition reform.

I was greatly honored to have the opportunity to work with him when I was at the White House, and I was President Reagan's representative to his Commission. He was a wonderful man, and we appreciate your allowing us to place this into the record, sir.

Senator COHEN. We will not only include it here in this record, but I will personally insert it in the Congressional Record and make a statement on the floor.

Mr. DOUGLASS. Thank you, sir. I would just like to make a couple of very brief, introductory statements, and then I would move very quickly, with your permission, to a briefing which walks you through the plan which we submitted last night. It also gives you also a brief update on where we are on the *Seawolf* program.

I want to start by saying that I am very lucky to have Admiral Lopez here at my side this morning. He has been with me every step of the way through the development of this submarine plan. Admiral Lopez can answer all of the questions on requirements and funding that the Committee may have. I will concentrate on the acquisition and technology questions. We will both be glad to answer any questions that the Committee may have for us.

I also want to thank the Committee for its past support, sir, of the Navy shipbuilding programs, and especially its submarine programs. We are mindful, as you said in your opening statement, that there was a very lengthy debate last year on the future of the submarine force. This Committee played a very, very important role in that debate, and we are very grateful to the Committee and to its Members for their evenhandedness and openmindedness in this debate. We feel that we received an extremely fair treatment from this Committee, and we want to thank you for that.

We also want to say how much we value the fact that you are getting independent advice on this subject. I am aware of the other panels that you have, and I think that is a very healthy thing, and we applaud you for doing that.

Sir, I want to begin my remarks today by saying that we feel that we have fully complied with both the spirit and intent of the Defense Authorization Conference Report that was issued as the bill went into law this year. This has been a long and difficult winter to fully comply with that. Many people have worked very hard. Secretary Dalton has placed all of the resources of the Department of the Navy behind this plan. We are very proud of the fact that we were able to deliver it on time. It is often very difficult to make these time lines.

We also want to thank Secretary Perry, Secretary White, and Secretary Kaminski, for the help that they gave us in the final weeks of working on this plan. Many of the people in the Office of the Secretary of Defense worked over weekends and late into the night to get this plan to the Congress in time.

We are dedicated to the competition that is called for in this plan. You will see that when I walk through the briefing.

I have a signed agreement by both of the two shipyards that will be involved in this competition as to how that competition will be structured. I feel that is a very, very important part of this effort, because the competition will not take place until the early years of the next century. Many of us may not be here at that time, and so having this agreement now as a foundation——

Senator WARNER. Would you repeat that statement? Competition will not start till when?

Mr. DOUGLASS. Sir, the time in which we will actually——

Senator WARNER. What was it you just said, though?

Mr. DOUGLASS. I said the competition would not start, meaning that the first time we would ask for a competitive bid would be after the beginning of the century.

Senator WARNER. The competition starts today.

Mr. DOUGLASS. Yes, sir, it does start today. The competitive procurement is what I meant.

Senator WARNER. I am listening to the English language.

Mr. DOUGLASS. Yes, sir. This is probably a good point for me to start with our presentation today.

CHART 1.—FISCAL YEAR 1997 NUCLEAR ATTACK SUBMARINE PROGRAM

ASSISTANT SECRETARY OF THE NAVY (RESEARCH, DEVELOPMENT AND ACQUISITION) AND DEPUTY CHIEF OF NAVAL OPERATIONS (RESOURCES, WARFARE REQUIREMENTS AND ASSESSMENT)

CHART 2.—NUCLEAR ATTACK SUBMARINE PROGRAM *SEAWOLF* STATUS

- Projected to complete program within the fiscal year 1996 Cost Cap of $7.223B
- SSN 21—Initial Sea Trials—Spring 1996
  - Schedule will be adjusted to stay within the Cost Cap
- SSN 22—60 percent complete
  - Seeing significant learning in the construction process
- SSN 23—Starter Construction December 1995
  - $699M Requested in fiscal year 1997
  - Remaining $105M to be requested in fiscal year 1998

Mr. DOUGLASS. The first chart deals with the status of the *Seawolf* program. Since this is a hearing on both *Seawolf* and the New Attack Submarine, we wanted to make the point, sir, that we are still under the cost cap, and let you know the first ship goes to sea trials early this spring. It is almost complete. The second ship is about 60 percent complete, and we are just, as you know, getting started on the third *Seawolf*.

I would tell you, sir, we are right on the razor's edge regarding the cost cap. We are having to watch this very, very closely. I meet with my team monthly to look at the cost cap. We are under it but, not by a very healthy margin.

Next slide, please.

CHART 3.—NUCLEAR ATTACK SUBMARINE PROGRAM NEW ATTACK SUBMARINE

- Emphasis on Performance
  - Stealth—acoustic and non-acoustic
  - Multi-Mission—Littoral and Blue Water
- Emphasis on Affordability
  - Acquisition Reform Initiatives
  - Control overhead—Shipbuilder downsizing
    - >> Computer-Aided Design
    - >> Integrated Product and Process Development
  - Leverage off *Seawolf* Technology
- Emphasis on Flexibility

— Open System Architecture—Compatible with Commercial Off-The-Shelf hardware and software
— Reconfigurable weapons space
— Modular Construction, Isolated Deck Structure

Mr. DOUGLASS. Moving to the New Attack Submarine, what we are doing, sir, is emphasizing three things, performance, affordability, and flexibility. These are the key hallmarks of the New Attack Submarine program. We think we have it well structured in order to meet those three objectives.

Senator WARNER. Do we have those charts before us here?

Mr. DOUGLASS. Yes, sir. I believe you have copies of the charts near you.

Senator COHEN. If you would just stop for a moment, my understanding is that before Senator McCain's subcommittee there was a request by the Navy to increase the *Seawolf* program by $104 million.

Mr. DOUGLASS. Yes, sir.

Senator COHEN. How does that relate to the cost cap?

Mr. DOUGLASS. It really has no relation to the cost cap, sir. You may recall that last year we requested all of the money to do the third *Seawolf*, and instead it was broken into two increments. For fiscal year 1997, we decided to break it into three increments instead of two increments. So that a request represents that if we were to be given extra money this year we would finance the submarine in two increments instead of three increments, but that does not affect the cost cap.

Senator COHEN. Why did you break it into three, as opposed to two?

Mr. DOUGLASS. Basically affordability, trying to smooth our shipbuilding budget.

Senator WARNER. Is the word competition to be found in the chart?

Mr. DOUGLASS. Yes, sir.

Senator WARNER. Where is that?

Mr. DOUGLASS. It is there on the top, sir.

Senator WARNER. I want to make sure you underline it.

CHART 4.—NUCLEAR ATTACK SUBMARINE PROGRAM COMPETITION

- Secretary of the Navy supports competition for Attack Submarines—Feb 1996
- Building a submarine at Newport News as early as fiscal year 1999 can be supported based upon design progress to date
- Have a written agreement between Navy and Shipbuilders to support competition
- Newport News involvement in 1996:
  - — $10M fiscal year 1996 RDT&E for engineering development
  - — About $9M fiscal year 1996 SCN for design transfer
- Navy fiscal year 1997 Budget Request identifies $35M to continue design transfer
- Nucelar components under contract. Complete set for fiscal year 1998 ship and partial set for the second ship

Mr. DOUGLASS. As you know, Mr. Chairman, we certified in February that we were going to do the competition. That was a part of the legislation which you passed last year. We made that certification as soon as we could possibly make it after the Conference bill became law. That requires us to build a submarine at Newport News as early as fiscal year 1999. I mentioned that I have a written agreement between the Navy and the two shipbuilders as to how this competition would proceed, and Senator Warner, as we just clarified, what I was thinking of before was the time when you go out for competitive bids, not the actual beginning of competition.

We have taken the money you gave us to begin this competition in fiscal year 1996. We have spent it the way you asked us to spend it. I have been particularly meticulous in working with the two yards to make sure that they are satisfied with this. Both yards have told me that they are satisfied with the way we are spending our fiscal year 1996 money.

There is money in the fiscal year 1997 budget request to continue the design transfer from Electric Boat to Newport News, which is essential to the execution of the competition. We have the nuclear components for both the fiscal year 1998 and 1999 boats under contract to the degree that you have funded those components.

Next chart, please.

CHART 5.—NUCLEAR ATTACK SUBMARINE PROGRAM VADM BACIOCCO PANEL RESULTS

- Proceed with the New Attack Submarine but commit to continuous evolution
- Define a single product manager for all attack submarines responsible for acquisition, life cycle support, and technology maturation/insertion
- Establish a significant, stable, continuing R&D program under the product manager that supports and matures major advances, reflects technology base opportunities, and responds to future missions
- Ensure that the technology base community understands the performance needs identified by the product manager, involves the shipyards as performers, performs utility analysis before pursuing evolutionary improvements, and has the courage to pursue potentially revolutionary technologies
- Specific techologies that should be pursued:

— Robust Hydrodynamic Program
— Active controls and Mounts
— Alternative Sail Designs
— Advanced Sensors
— Electric Drive
— External Weapons

Mr. DOUGLASS. We have also asked that an independent panel take a look at the design and construction of our program. You will be hearing from that panel later today, so I will not go into a lot of detail on the results of that panel. It is probably better for them to tell you what they found than it is for me to tell you what they found.

I think you will, sir—and I would encourage you to press them on this point—find that they were totally independent of the Navy. I did not try to influence the outcome of that panel in any way. I gave them the latitude to look at this problem from a completely independent point of view.

That panel is headed by a distinguished retired Vice Admiral, Vice Admiral Baciocco, who was one of the Navy's outstanding research and development officers during his career. The panel consists of many members from academia, from the Defense Science Board, and from industry. There was a member from each shipyard on that panel. I feel that we got a very good objective look at the construction of the program and the design of the submarine by this panel.

Their key findings are listed on this chart. The first and most important finding is that we should proceed with the New Attack Submarine program. They recommended some internal changes in the way the Navy is organized to execute this program, and I am considering those changes. I will be making changes internal to the Navy acquisition process primarily, sir, to link up technology with the execution of the program.

That is the major thrust of their recommendations. They were very, very helpful to us in identifying a set of technologies for us to invest in for the future which will allow us to continually improve the design of the New Attack Submarine as this program moves forward. I think the rest of the explanation of what they did might best come from them.

The next slide, please.

CHART 6.—NUCLEAR ATTACK SUBMARINE PROGRAM—MARCH 1996 REPORT

- The report prepared by DOD is consistent with the fiscal year 1996 Defense Authorization Act
- Navy can execute any of the proposed options if funded
  - — Congressional option requires approximately $3.8B additional SCN funding over period 1997–2001 for competition and construction of two additional submarines
  - — Additional Core RDT&E funding needed for transitioning technologies—estimate at least $60M per year
  - — Substantial RDT&E funding needed to accelerate the insertion of specific new technologies
- USD(A&T) oversight established with a clear structure
  - — Submarine Technology Oversight Council

Mr. DOUGLASS. Our report to the Congress, which you received last night, is fully consistent with the Defense Authorization Act of last fiscal year. We can execute any of the options in there if we get the money to do it.

It does require additional money in the FDYP. I would emphasize, though, that that money is not a total addition to the program, but it is money that is moving ships forward from the end of the program to the front of the program.

We are asking for more research and development money. We think we need to add about an extra $60 million a year to bring the technology Navy submarine program up to the level that was recommended by the Baciocco panel and others. We have identified some near-term technologies that could be inserted into the first four boats to make them more effective if funding was available.

Finally, the law asked us to look at the oversight that is provided to this program by the Office of the Secretary of Defense. We have established an oversight council for the future execution of this program. Dr. Kaminski and I would cochair that panel along with principal members of his staff, my staff, and representatives from DARPA. That is all in compliance with the law, sir.

Next chart, please.

CHART 7.—NUCLEAR ATTACK SUBMARINE PROGRAM CONSTRUCTION ALTERNATIVES

	FY98	FY99	FY00	FY01	FY02	FY03	FY04
Baseline Milestone II	1-EB	0	1-EB	0	2-EB	2-EB (Potential Compete)	2-EB
Alternative #1	1-EB	1-NN	1-EB	0	1-EB 1-NN	1 Compete	2 Compete
Alternative #2	1-EB	1-NN	1-EB	1-NN	1-EB	1-NN Compete 1	1-EB
Alternative #3 Congressional Program	1-EB	1-NN	1-EB	1-NN	0	1-EB 1-NN Compete	2

Mr. DOUGLASS. This is just a summary of what is in the plan in terms of options. One option was laid out for us in the law. That is alternative three. I would point out to you that we discovered in the execution of that option that it had a problem. If you read the law literally, it led you to believe that there would be no boat in fiscal year 2002.

That is a serious problem. We think that is a drawback to the structure of the plan outlined in the law. We corrected that by offering an alternative that you see on the board. That is alternative 2. Alternative 1 is another alternative that was added. The basic President's budget is shown at the top.

Sir, Admiral Lopez and I would be glad to answer any questions the Committee may have about the plan, or the program, or any other aspect of the Navy submarine work that might be appropriate.

[The prepared statements of Mr. Douglass and Admiral Lopez follow:]

PREPARED JOINT STATEMENT BY HON. JOHN W. DOUGLASS, ASSISTANT SECRETARY OF THE NAVY (RESEARCH, DEVELOPMENT AND ACQUISITION) AND VICE ADM. T. JOSEPH LOPEZ, USN, DEPUTY CHIEF OF NAVAL OPERATIONS (RESOURCES, WARFARE REQUIREMENTS AND ASSESSMENTS)

Mr. Chairman, distinguished members of the subcommittee: I appreciate having this opportunity to discuss the current status of the Navy's submarine programs with you today. It is an honor and a pleasure to appear before you in this setting among so many people whom I have worked for and for whom I have such high regard.

HISTORY

If history is any guide, the Navy, and the submarine force in particular, is likely to witness far-reaching changes in the international environment during the next 30 or 40 years. From our vantage point now, it is impossible to predict with any accuracy exactly what threats our submarine force will face so far in the future. Consequently, we must seek the most capable and most adaptable ships possible to meet the uncertain challenges of the next century.

In the early 1980s, continued improvements in Soviet attack submarines and the aggressive Maritime Strategy led a push to develop a new, highly advanced attack submarine. The resulting *Seawolf* (SSN 21) class benefited from significant investment in research and development funding, including DPA's Submarine Technology program. This unprecedented technology effort has paid off. *Seawolf* will be the fastest, quietest and most heavily armed attack submarine ever built by the United States. These advances, however, also cut the program short; the staggering investments in research and development and sophisticated new capabilities helped drive recurring ship costs up to a level that were considered unaffordable in the post-Cold War threat and domestic fiscal environment.

The post-Cold War world has a new set of strategic and operational priorities, including an emphasis on regional war-fighting, the requirement to conduct joint operations, and a pronounced budget-consciousness in a time of tightening defense resources. As in times past, the inherent flexibility of America's submarine force has allowed it to shift its operational focus to match these changes in the strategic environment.

Technology is, and has always been, the key to submarines flexibility. The twin legacies of the *Seawolf* program—the quantum leap in submarine technology and the knowledge that future submarines must remain affordable—are the base upon which the New Attack Submarine has been developed. The New Attack Submarine Program has successfully leveraged many important technologies initially developed for *Seawolf*, thus incorporating high levels of stealth, improved sonar systems, and quieter propulsion at significantly reduced cost. The New Attack Submarine is not a cheap *Seawolf*; it has built and expanded upon technologies already paid for, adapting them for use in a smaller submarine that is tailored for the post-Cold War operational environment. We have carefully addressed operational, warfighting requirements in our best for a truly affordable warship.

CURRENT PROGRAMS

In fiscal year 1997, the Navy is requesting funding for two attack submarine programs, *Seawolf* and the New Attack Submarine.

SEAWOLF (SSN–21) CLASS

The world's finest submarine will begin prowling the oceans when *Seawolf* begins her sea trials this spring. The ship will meet all performance requirements and will remain under the congressionally mandated cost cap. Construction of the second ship of the class is continuing and the ship is now approximately 60 percent complete. The second ship, *Connecticut* (SSN 22), will be delivered in 1998. Finally, construction of the third and final *Seawolf*, the SSN 23, began on 12 December 1995, after passage of fiscal year 1996 legislation. We have requested $699.3 million Shipbuilding and Conversion, Navy (SCN) funds in fiscal year 1997 for SSN–23.

NEW ATTACK SUBMARINE

The New Attack Submarine is also proceeding. This program will result in a class of attack submarines that will continue to uphold United States undersea superiority far into the next century with an eye on long term affordability.

The requirement for a new class of attack submarine is based on the realities of force-structure considerations and on current and anticipated future warfighting requirements. The New Attack Submarine is the Navy's first submarine specifically designed to satisfy a broad spectrum of regional and littoral mission requirements while retaining blue-water undersea battlespace dominance. It will surpass the overall warfighting and peacetime performance of any current or projected threat submarine.

In determining our attack submarine requirements, the Joint Staff mandated that the Navy have ten to twelve submarines with *Seawolf*-level stealth by 2012. Despite its lower cost, the New Attack Submarine will be as quiet as *Seawolf*, and will be procured in sufficient numbers to meet this force structure requirement. Furthermore, the Joint Requirements Oversight Council of the Joint Chiefs of Staff also determined that the Navy's next-generation attack submarine must be able to carry out seven specific missions:

- Covert Strike Warfare
- Antisubmarine Warfare (ASW)
- Covert Intelligence Collection/Surveillance, Covert Indication and Warning, and Electronic Warfare
- Anti-surface Ship Warfare (ASUW)
- Special Warfare

- Covert Mine Warfare
- Battle Group Support

The New Attack Submarine will effectively perform all seven. The most dramatic of these, covert strike warfare, was demonstrated in the 1991 Persian Gulf War, in which two *Los Angeles* (SSN–688)-class attack submarines launched 12 Tomahawk Land-Attack Missiles at critical targets in Iraq. The New Attack Submarine's Tomahawks, which have a range of approximately 650 nautical miles, may be complemented in the future by weapons such as a submarine-launched versions of the Army Tactical Missile System (ATACMS), a shorter-range, Global Positioning System-guided ballistic missile capable of carrying 300 M74 anti-armor/anti-personnel submunitions. In June 1995, the Navy announced that ATACMS could be launched from a submarine's Vertical Launching System tubes with relatively minor modifications.

The New Attack Submarine's anti-submarine warfare and anti-surface ship warfare capabilities rely on a combination of stealth, sensors, and weaponry. The ship will be armed with Harpoon anti-ship missiles for ASUW and MK 48 Advanced Capability torpedoes for both ASUW and ASW.

The New Attack Submarine incorporates a wide range of improved systems to support covert intelligence collection, surveillance, electronic warfare, and reconnaissance. The New Attack Submarine's stealth guarantees its ability to carry out this mission while remaining undetected. Its sail will house two new photonics masts for improved imaging functions, an improved electronic support measures mast, and multi-function masts that cover the frequency domain for full-spectrum communications. The design includes extremely high frequency and super-high frequency communications masts as well as accommodations for a special "mission configurable" mast. Improved communications systems scheduled to be in place before the turn of the century will ensure that intelligence-gathering submarines are able to transmit their data quickly and effectively to other forces.

To further enhance submarine capabilities in this area, the Navy is developing a submarine-deployed undersea surveillance system called the Advanced Deployable System that is designed to detect quiet diesel submarines operating in shallow waters, observe mine-laying activity, and track surface ships to provide warning of hostile activity. In the future, submarines will also use Unmanned Underwater Vehicles (UUVs) and Unmanned Aerial Vehicles (UAVs), or drones, to collect intelligence or conduct sustained surveillance. The Navy will receive its first UUV system, the Near-term Mine Reconnaissance System, in fiscal year 1998.

The New Attack Submarine will provide unprecedented support to the full spectrum of special operations missions. A nine-man lock-out/lock-in chamber will be used to insert Special Operations Forces. The New Attack Shrine will host the Advanced Swimmer Delivery System, a mini-sub for inserting and extracting Special Operations teams from more than 100 miles offshore. When fitted with Dry Deck Shelter, the New Attack Submarine can deliver even more Special Operations Forces and their equipment, quickly and quietly, while remaining submerged and undetected.

Mine warfare is a critical element of sea control and sea denial. All United States attack submarines carry the MX 60 CAPTOR (enCAPsulated TORpedo), a deep-war anti-submarine weapon. The Navy expects to deploy as Advanced Mobile Mine, after the turn of the century. The submarine's advanced organic sonar sensors, enhanced electromagnetic stealth, and UUVs will also enable it to opera in mined areas with lessened risk.

Finally, the New Attack Submarine will provide important battle group and joint task force support. Enhanced two-way communications allow submarines to work closely with their surface and aviation counterparts, permitting them to work more fully with carrier battle groups. United States submarines will also play an integral role in joint task forces, incorporating elements from all the services.

Those capabilities will be supported by New Attack Submarine's 12 tube Vertical Launching System, four 21-inch torpedo tubes, and a host of improved sensors, including the Light-Weight Wide Aperture Array, which will provide dramatic improvement in detection and contact localization, particularly in shallower water.

Yet threats and technologies change, and our submarines must maintain their superiority far into the next century. To ensure this, we have incorporated numerous special design elements into the base design for the ship to ensure design flexibility; that is, our ability to upgrade or alter the submarine design to quickly and affordably insert new technologies or equipments as they are developed.

The New Attack Submarine is being designed specifically for modular construction, which will cut costs and allow the incorporation of mission-specific hull sections during future new construction. The individual basic ship construction modules can be tested before installation into the hull, preventing costly replacements or changes later in the construction process. The ship's modular design includes the Modular Isolated Deck Structure, an innovative feature that provides sufficient shock and acoustic protection to allow the use of commercial electronics. In the future, new systems, new technologies, and upgrades will be more easily and cost-effectively tested and backfitted into the New Attack Submarine, thereby avoiding unit and class obsolescence that so often has plagued other warships.

A second key to the New Attack Submarine's design flexibility is the use of an Open System Architecture compatible with existing and projected commercial off-the-shelf (COTS) hardware and software. By using an Open System Architecture, this system will remain compatible with emerging commercial-based electronic technologies, providing affordable and adaptable solutions to support current and future mission performance requirements. Of the New Attack Submarine systems taking advantage of the benefits of open system architecture and commercial technologies, the Command, Control, Communications, and Intelligence (C^3I) System is by far the most important. The system will benefit from the expanded use of non-developmental items and commercial components for connectivity among the sonar, fire control, navigation, electronic support measures, and communications systems. Integrated electronic systems with commercial components will allow state-of-the-art technology insertion throughout the lifetime of the class. Consequently, New Attack Submarine electronics design can benefit in full from rapid advances made in the commercial electronics industry.

One of the particularly important modules is the ship's weapon stowage and handling system, which will provide efficient weapon stowage and enable weapon reload rates that meet ship mission requirements. The module is also completely reconfigurable to provide a large, open, easily rearranged space to carry a variety of weapons and support non-traditional missions such as hosting Special Operations forces or Unmanned Undersea Vehicles (UUVs). This reconfigurable module, which is unique to the New Attack Submarine, is a key element of the ship's mission-flexible design.

The New Attack Submarine program is also leading a revolution in warship design and construction practices; the flexibility of the ship's design is complemented by the flexibility of the design process. The New Attack Submarine Program has been lauded as a leader in DOD acquisition reform. The program has taken the most innovative commercial practices and applied them to designing the next generation of nuclear attack submarines. The result will be a class of highly capable submarines that will also be the most affordably and efficiently produced warships the United States Navy has ever procured. These innovative design processes are also crucial to implementing the current New Attack Submarine design and construction plan.

The Navy's decision to use the Design/Build, or Integrated Product and Process Development (IPPD) approach for the New Attack Submarine sets the program apart from previous Unites States Navy ship procurement programs. With Integrated Product and Process Development, teams comprising representatives from the Navy, key vendors, designers, and the shipbuilder are working together to design and develop both the ship and its manufacturing processes. These teams make design decisions based on what is best for the ship, what is easiest to build, and what is the least life cycle expensive option that still satisfies operational need. IPPD will help ensure affordability through all phases of the New Attack Submarine design and construction effort.

The New Attack Submarine is being designed using the most advanced computer-aided design technology currently available. Computer-aided design has been used to design cars, military aircraft, and commercial aircraft, but the New Attack Submarine is the most complex product ever designed solely on a computer. By using leading-edge computer-aided design technologies, changes to the design can be easily integrated without requiring that the blueprints be laboriously re-drawn by hand. The design can then be comprehensively evaluated using the Electronic Visualization System, which provides computerized simulations demonstrating the impact that any change to the design will have on the rest of the submarine.

The New Attack Submarine Program has, from the outset, emphasized flexibility in mission capabilities, in the ship's characteristics, and in the actual design process. To ensure the ship's superiority far into the future, we are proposing a revised construction plan. The flexibility and openness to change in our current design will support and benefit from our revised plan.

FUTURE PROGRAM

Overview

To comply with the Fiscal Year 1996 Defense Authorization Act the Department developed a report to the Congress for the New Attack Submarine entitled Secretary of Defense Report on Nuclear Attack Submarine Procurement and Submarine Technology.

This report outlines our goal to provide the nation with the most capable, nuclear-powered attack submarines possible within fiscal constraints. These submarines will incorporate state-of-the-art technologies to support military requirements. Moreover, in producing these ships we will sustain the industrial base needed for competitive production of future submarines while meeting force level requirements established by the Unified Commanders-in-Chief and the Joint Staff.

To achieve this, we propose to use the current New Attack Submarine design as a base from which the Electric Boat Corporation and Newport News Shipbuilding will each build ships. Each yard will propose enhancements to the base design to incorporate producibility improvements or upgraded technologies that can be incorporated as deemed prudent within fiscal cons trains and other mission priorities. The Navy will use the upgraded design for serial production.

Work on this effort has already begun. The Navy and our two contractors, Electric Boat and Newport News, have agreed in writing to a design transfer process that will enable Newport News to begin New Attack Submarine construction as early as fiscal year 1999. To this end, we have already begun transferring New Attack Submarine design information to Newport News. Procurement of the first two submarines of the class has already begun, using advanced procurement funds provided by Congress in fiscal year 1996.

DEVELOPMENT OF NEW PROCESSES, TECHNOLOGIES, AND CAPABILITIES

Technology insertion is a key goal of the proposed submarine construction plan. By producing several ships to evolve the design for the entire class, we have the opportunity to allow technologies now under development that are not available for the fiscal year 1998 ship to mature for incorporation into later ships. The construction plan is accompanied by several initiatives to boost development of submarine technologies.

To advance technology from early development to operational status we will consider feasible, existing and projected technologies for incorporation into the New Attack Submarine. A team of Flag-level and senior civilian leaders from the Department of Defense science and technology, research and development, acquisition, and operational areas has been overseeing this process. The team is supported by eleven working groups, nine of which are responsible for technology development and transition efforts in a specific submarine system area, with the other two focusing on improving training, mission analysis and design integration.

The increased emphasis on research and development and continual program oversight will ensure that all potential technologies are carefully assessed, and that the evolved New Attack Submarine design will have necessary capabilities.

We believe firmly that the base New Attack Submarine design will yield a ship that is the world's finest when she reaches the ocean early in the next century. However, we also recognize that technology will continue to progress as we build successive ships. Given the constraints presented by force level requirements and industrial base concerns, we cannot delay construction while waits for new technologies which seem to be just around the corner.

We also realize that the programs schedule is tight. The Defense Authorization Act mandates that the ship design for serial construction be selected earlier than fiscal year 2003. The lead New Attack Submarine will not be delivered until 2004, thus it will not be possible to thoroughly evaluate the warfighting capabilities of the four ships prior to proceeding with construction to the evolved design. We will, however, be able to determine which technologies can help reduce costs ensure that these technologies are included in successive ships.

COMPETITION

Competition is a second key element of the plan. For consistency and cost effectiveness, Electric Boat will retain lead yard responsibility, including final integration of new technologies approved for each subsequent ship into the design. The evolved ship design will incorporate the best and least-costly combination of new construction process and technologies based on experience gained by both shipbuilders from the first several ships.

The Navy has certified, in our February 1996 letter to the Congressional Defense Committees, we will maintain two submarine shipbuilders. This serves a hedge against a disaster, natural or otherwise, that could close one of the yards.

IMPACT ON AFFORDABILITY

The down side of advancing submarine procurement is that it will increase near term program funding requirement. From fiscal year 1997 through fiscal year 2001, we estimate that the congressionally proposed four-ship plan will cost an additional $3.8 billion in Shipbuilding and Conversion, Navy (SCN) funding for accelerated construction of two ships, and require both additional Research, Development, Test, and Evaluation (RDT&E) and SCN funding to mature technologies and incorporate them into the evolving design. The level of additional funding will vary depending on the number of affordability and capability features that are added to these ships.

Most of the additional SCN funding is due to the acceleration of two ships from our outyear plan into the Future Years Defense Plan (FYDP), which currently funds only two New Attack Submarines, one in fiscal year 1998 and the other in fiscal year 2000. Additionally, there are costs for introducing competition, as Newport News will need funding for design transfer from Electric Boat.

The report outlines optional levels of funding over the next 7 years to develop the technologies for improving the superiority margin, affordability and capability. To finish development of the technologies identified by the Defense Advanced Research Agency (DARPA) and other sources, the Navy is evaluating core technology investment options. The Navy's preliminary estimate is that an increase of $60 million per year of research and development funding might be required. In the 1980s, investment of this nature produced breakthroughs in many aspects of submarine design, which led to *Seawolf*. Building on that base, we now have the opportunity seek further breakthroughs. We can develop them, test them, and evaluate them without being trapped into a certain design.

COST REDUCTION AND AFFORDABILITY

Our attack submarines, both *Seawolf* and the New Attack Submarine, must be affordable to the nation. The *Seawolf* program is under its cost cap. This has been verified by an Independent Review Team. The program will continue to carefully monitor and manage costs and program schedule to ensure that the ships stay under the cap.

From the very beginning of work on a next-generation attack submarine to follow the *Seawolf* class, we have been conscious of the need to ensure that it remains affordable, both to procure and to maintain throughout its life cycle. As discussed above, the base design has emphasized cost control and reduction from the outset.

The primary savings in the ship design have been from cost and mission effective capability tradeoffs. In addition, the Navy is reviewing lessons learned from previous programs and is undertaking a comprehensive analysis of processes and parts that has already resulted in dozens of improvements. We are reviewing the *Seawolf* lessons learned database for potential cost savings in design features as well as construction and program management. This is actually a mutual effort between the *Seawolf* and New Attack Submarine programs.

The features that support flexibility in the New Attack Submarine design and design process, such as IPPD, computer aided design, a COTS-based open-system C^3I system architecture, and modular construction, have already lowered the submarine's cost significantly. IPPD teams include both shipyard personnel and operators, the ship can be designed to facilitate construction, operation and maintenance, lowering costs from the moment the keel is laid through the ship's decommissioning far in the future. Likewise, commercial products will be less costly to upgrade or replace than military-specification equipment or software, again lowering both procurement and life-cycle costs.

The Navy has also reduced estimated costs to reflect refining the design and eliminating low value added requirements. The Program Office and contractors have examined all systems, eliminated inefficiencies, and inserted new cost-efficient technology wherever possible. This includes streamlining procurement specifications and transitioning the ship's requirements from military specifications to performance or equivalent commercial specifications where feasible. Specifications are also being selectively relaxed in areas that do not affect the ship's capability.

These initiatives are accompanied by changes in Government audit and oversight and approval requirements. The Navy is working to minimize the number of reviews and sign-offs required throughout the design and construction processes. Streamlining the oversight process is expected to smooth development and production of the

New Attack Submarine and reduce the number of hours the Navy and the shipyard must spend on paperwork.

Many of the New Attack Submarine's new technologies or design features will lower life-cycle costs while improving submarine performance. Most significantly, the new reactor plant is smaller and simpler than any previous United States submarine reactor, but has a greater energy density. It is the first plant designed for a life-of-the-ship reactor core, which will obviate the need for a mid-life refueling, saving hundreds of millions of dollars in refueling and waste disposal costs for each New Attack Submarine.

CONCLUSIONS

The Navy's submarine programs will provide the nation with submarines capable of meeting any present or anticipated threat. In particular, the present New Attack Submarine plan, the baseline plan, will provide the Navy and the nation with a highly capable warship for an affordable price.

History shows us that in times of dramatic international change, adaptability is critical to our military forces. We cannot foresee with certainty what we will ask of our submarines in the future; we can, however, be sure that their stealth and firepower will contribute greatly to sustaining the peace or, if worst came to worst, to winning the war. Building upon the knowledge of the *Seawolf* program, the New Attack Submarine is the right design for the future.

Senator COHEN. Admiral Lopez, do you have a statement to make?

Admiral LOPEZ. No, sir. I am ready to answer your questions.

Senator COHEN. So you really want to hold onto the characterization of Laconic Lopez, Silent Cal?

Admiral LOPEZ. In keeping with the image you describe, sir.

Senator COHEN. Senator Lieberman.

Senator LIEBERMAN. I was just going to ask if, as part of the opening testimony, Secretary Douglass could add a little more detail, but not too much, to describe these options for the subcommittee.

Mr. DOUGLASS. Yes, sir. I will go from top to bottom, if you would like me to do that, Senator.

Starting at the top was where we began this process, and as you can see, it has one boat. It only involves one shipyard, and if competition is to be injected into that plan, it would have to come sometime around fiscal year 2003, or out further. That is just potential competition. We have not taken time to figure out how we would do that because it does not seem feasible to us right now to do that.

Alternative 1 adds a boat in fiscal year 1999 to Newport News, and then calls for competition to begin in fiscal year 2002, in which EB and Newport News would both get a boat and compete for a third boat, which would be to begin in fiscal year 2003.

Alternative 2 gives a boat to Electric Boat in fiscal year 1998, Newport News in fiscal year 1999, Electric Boat again in fiscal year 2000, Newport News again in fiscal year 2001. Then a boat would go to Electric Boat in fiscal year 2002 which would be the bridge year before the competition would go out, in which Newport News would get the boat in fiscal year 2003, and electric boat would get a boat in fiscal year 2004, and you would compete for that extra boat in fiscal year 2004.

Alternative 3 is our best attempt to lay out a plan that complied with the Conference Report. That is very similar to Alternative 2, except there was a little clause in the Conference Report that led us to believe that under that plan there would be no boat in fiscal year 2002, and that is clearly a problem for Electric Boat, because it gaps them a year.

We felt by presenting that range of options we would be fully complying with the intent of both the House and the Senate as indicated in the Authorization Conference Report, Senator.

Senator LIEBERMAN. Thank you, Mr. Secretary. Thank you, Mr. Chairman.

Senator COHEN. Admiral Lopez, let me begin with a question about the nature of the threat, because there is some ambiguity in terms of the information that has been presented to this subcommittee.

I am looking at a chart or slide that was provided to the House National Security Committee by Mr. Polmar, and you come to two different conclusions. If you look at one slide it shows that there is only a marginal improvement over the next generation of Russian submarines, the improved Akula and the follow-on, with the *Seawolf* and our New Attack Submarine, very marginal according to this one chart, and I will let you look at it. If you are not familiar with it, I can send it down for you to look.

Then I have a second slide that was presented to this committee which then shows a rather significant capability, superiority in terms of quieting over the Soviet follow-on generation, and so I guess I am confused in terms of which is which.

Has the whole issue been policitized? The Navy comes to the committee in a time of authorization or appropriation and says, here is a new sub, and here is the follow-on, and it will give us X margin of superiority well into the future, and then we have another slide that is being presented saying it is of only marginal superiority, and I frankly need to have someone clarify that for me.

Admiral LOPEZ. Yes, sir. I think the slide that you have from our presentation is at least a year, perhaps 2 years old. The one we discussed most of last year is in concert with Mr. Polmar's slide, and part of that is because the threat is evolving.

As you know, I am not in the intelligence business, however we are satisfied that our New Attack Submarine and our *Seawolf* are going to be in close proximity—without the decibels shown on the chart that Mr. Polmar has. That is about right.

We are quite comfortable that when you superimpose not only quietness, which is what this indicates, but the training that our young American sailors receive, and also the sensors that we use off-ship and on-ship, that we still have by far the superior submarine service. I am quite comfortable with that.

Senator COHEN. Well, I am still a little bit confused. I assume that if we had the chart that was given to the subcommittee, that—it is 2 years old, it projects from 1960 out to the year 2010. I assume that when this was provided 2 years ago that the Navy counted on the basic training and OPTEMPO superiority of the U.S. Navy over that of the Russians. I assume that calculation was the same 2 years ago as it is today, is it not?

Admiral LOPEZ. Yes, sir, with some intelligence changes, and not to get into anything classified, but there are changes in quietness with speed. The case that Mr. Polmar's slide shows you in my estimation is the worst case for now, where in quietness at a specific speed, they are in the relative position that is shown on his slide.

I would really rather brief you one slide versus the other in a classified hearing.

Senator COHEN. Well, I think it needs to be addressed, because it is very confusing to the subcommittee as to whether or not the entire issue is being politicized, that we get one set of books for the committee and a different set of books for those in the field who are doing the studying, and it is causing even more confusion in the course of the debate.

Secretary Douglass, let me talk about the state of our design. Is it correct to say the new SSN is not technically robust?

Mr. DOUGLASS. No, sir, I would not say that is correct. I think it is technically robust.

Senator COHEN. Do we need to invest a significant amount of money in improving the submarine?

Mr. DOUGLASS. We do, sir, but we do that for all weapons systems. I think one of the things that is very important to remember however, is that the industrial base for submarines is different than the industrial base for your average weapons system. We have an industrial base now that is now down to two vendors. We need to keep the design teams at those two yards intact or there will not be a submarine after this one.

There is a misconception that if you just construct submarines, that is all you need to do to keep the industrial base live. You need to keep the design teams going as well.

Our proposal is to continually improve the design of this submarine over the years by using design teams in the yards and using our technology base so that we are prepared for the future even after this program is complete. There will be significant improvements, but it does not mean the design as it is today is not robust. It is robust.

Senator COHEN. Can the new submarine be modified as new and better technology comes on line?

Mr. DOUGLASS. Yes, sir, it can. That was one of the findings of the Baciocco panel. We believe they can be changed by inserting appropriate technologies.

Senator COHEN. Any constraints that would prevent the kind of changes and modifications that might be necessary, as with a smaller submarine where size constraints come into play?

Mr. DOUGLASS. No significant constraints, Senator.

Senator COHEN. Do you agree, Admiral Lopez?

Admiral LOPEZ. Yes, sir, I do. I think this is the 21st Century submarine. This ship is designed for what we envision the use of submarines to be in the 21st Century. Whether you talk about modularity, where you could backfit a Tomahawk missile, or even if we needed Tridents beyond the life of the current Tridents, you could backfit a section in there.

It is one-stop shopping,—fiberoptics are included, suspended decks rather than suspended equipments, the ability to move in COTS, and so we are quite satisfied. Where we do not have the technology inserted today, that we have the growth potential to put it in.

Senator COHEN. Senator Lieberman.

Senator LIEBERMAN. Thank you. Thank you, Mr. Chairman. This is an important hearing, and it measures in a clear way, I think, how far we have come with the submarine program.

My friend and colleague from Virginia was anxious that the word competition be in this, and I agree with him, but I think the important thing to note is that we are using the word competition and not combat. The Senator-to-Senator combat and yard-to-yard combat has ended, and we are now in a period of healthy competition to produce the best boats we can, and I appreciate that the report——

Senator WARNER. Senator, if you would yield, I thank you for that. Just as soon as this Presidential budget came up and disclosed what I regard as something other than what was intended by the law, you were the first, and Senator Dodd the second, to approach me on that. You said the competition no longer is here in the Senate, the competition is in your building, and I thank you.

Senator COHEN. The Senator from Connecticut's time has expired. [Laughter.]

Senator LIEBERMAN. Admiral Lopez, do you think that he considers anybody whose name begins with L to be laconic? [Laughter.]

Admiral LOPEZ. I am going to have to go back and look at that in a dictionary.

Senator LIEBERMAN. I thank Senator Warner. I am actually going to ask a question about that, but let me begin with this. Let us talk first about the *Seawolf*. I know that you, Secretary Douglass, and the Navy and the Contractor have worked hard to improve the management and oversight of the *Seawolf* program in the last year or so. Would you describe for us the judgment used in dividing the remaining funding for the third *Seawolf* into two parts, and tell us whether you think it will have any effect on the building of the boat and the efficiencies that you have achieved?

Mr. DOUGLASS. Sir, we do not think it will have any effect on the building of the boat or the efficiencies or the cost cap.

First, let me say that the Department is opposed to split funding in general. There are occasions when there are exceptions to that rule, but I think the official policy of the Department of Defense is that in general we oppose split funding.

In this case, the boat had already been split-funded, so it was a question of once you have crossed the Rubicon and split it once, would it hurt the program to split it twice?

We felt not, but we would feel more comfortable if we could have afforded all of that money in fiscal year 1997. That is why, as Senator Cohen points out, if a list were to be provided of what additional funds the Navy could use in fiscal year 1997 this money would be on the list. I do not think there is any impact to the program. In general we do not like to do it as a policy issue, but it was done as an affordability issue.

Joe, would you like to comment? Joe is the money person.

Admiral LOPEZ. We are quite comfortable. Obviously, we would like to fund everything up front, but in this situation we do not see any impact to the program.

Senator LIEBERMAN. I appreciate that.

Following up on the conversation with Senator Warner, I presume, therefore, that you would also have on that list of what you might do with additional funding if it was available, the long lead funding for the 1999 New Attack Submarine to be built at Newport News, is that correct?

Mr. DOUGLASS. It is my understanding that it is number 1 on the list.

Senator LIEBERMAN. The reason that it was left out was a resource question, I presume, and not a policy judgment.

Admiral LOPEZ. That is true, sir. It is not just in submarine warfare, but across the entire Navy. We have to, in our process balance the Navy as best we can within the constraints of affordability.

Senator LIEBERMAN. Let me ask you, and this is a very broad question, one of the witnesses in the later panel in his prepared testimony criticizes the agreement made last year for the competition for the New Attack Submarine saying that it resulted in a "compromise that legislates mediocrity." Do you agree with that, and you had better give the right answer. [Laughter.]

Mr. DOUGLASS. No, sir, I do not agree with that. I, as you know, have been on the staff of this Committee, and I know how hard this Committee worked to see the right thing done for the Navy submarine force last year. I know that to get things done in this town you have to compromise, and I do not think that the agreement that was established last year in any way leads us to mediocrity in the program.

It seems to me those agreements had to be made in order to balance the overall bill, as the House and the Senate saw those bills. So I would not subscribe to that statement, sir.

Senator LIEBERMAN. Obviously, both Electric Boat and Newport News would have loved to have been able to build all the New Attack Submarines, but I think we ended up concluding that that was counterproductive. In terms of the standards set it does seem to me that competition offers higher hopes that we have gone well beyond mediocrity.

Admiral, do you want to add anything?

Admiral LOPEZ. Sir, I am quite comfortable with the direction we are going. I think competition is healthy, and we intend to provide the best Navy in the world as long as we can get funded.

Senator LIEBERMAN. Let me come back to one of the other witnesses in the second panel who has said in another setting that the Navy's establishment is burdened with traditional, deeply rooted, and powerful vested interests that encumber innovation.

I thought I would like to give you an opportunity to respond to that in just a bit more detail generally, but also specifically about what the Navy is doing to foster innovation in the submarine building program.

Mr. DOUGLASS. Well, sir, I do not think it is hampered. I have only been there 154 days, but I have been very, very pleased with what I have found since I have been there. We have a wonderful acquisition reform program.

Acquisition reform is alive and well within the New Attack Submarine program. My impression of the Program Executive Officers and Program Managers that are provided to me to manage my programs is that they are the very finest people that I could want to have.

The team of submariners who worked with me in the formulation of this plan which is submitted to this congress worked night and day. I found them to be open to new ideas, and new concepts. I think people who say that the Navy is not being innovative just plain do not understand.

I think there are many people sir, whose minds are locked up in the Cold War. They do not understand the things that our CNO is doing to make change within the Navy. They do not understand what our Commandant is doing in the Marine Corps.

My assessment of the leadership from the Secretary, from the CNO, and down to the flag officers that I work with is, innovation is alive and well in the Navy, and I have no complaints in that regard.

Senator LIEBERMAN. On the particular subject of the New Attack Submarine, what can you tell us about what there is in the system to give us some confidence that innovation will be incorporated in the program as we go along?

Mr. DOUGLASS. If you look at the plan that we submitted to you, it is a detailed plan, and I think you will find a very healthy recipe for new technologies for us to explore.

If you ask yourself what would give you confidence, one thing that would give me confidence if I were in your shoes, sir, would be to look at the rich diversity of activities that we have offered that we are going to go work on.

The second thing that I would say should give you confidence is that once again an outside panel of the very best scientists, engineers, technologists that I could find to work on this problem have validated that we are on the right approach. These are not people who could be associated with previous Navy thinking. These are former Navy people, Army people, and Air Force people; people from academia; people from industry all working together. They have validated that we are on the right track.

I might add also, sir, there were five other independent studies done in previous years that showed that this design is the right approach. So I think if you add those studies up and you look at the number of prestigious Americans from the science and technology community who have examined this problem and said we are moving in the right direction, it should give the Congress some confidence that we are moving in the right direction.

Senator LIEBERMAN. That is a strong answer, and I thank you for it.

My time is up. Thank you, Mr. Chairman.

Senator COHEN. Senator Warner.

Senator WARNER. Thank you, Mr. Chairman.

Secretary Douglass, I want to go to this page, and there are no numbers on the pages. It appears to be the one entitled, Attack Submarine March 1996 Report. Can you flip to that?

Mr. DOUGLASS. Yes, sir.

Senator WARNER. In your service here in the Senate, while you may not have had responsibilities in your committee assignments, you certainly followed a lot of the war powers debate, did you not?

Mr. DOUGLASS. Yes, sir, I did.

Senator WARNER. You know that no President has ever complied with the War Powers Act, correct?

Mr. DOUGLASS. I do not know. I am not an expert in that.

Senator WARNER. Very cleverly, they selected language in the various submissions required by that act to distance themselves from complying with the letter of the law, and I am telling you what has happened because I have been here with this fine man for many years debating this on the floor of the Senate.

Let me read to you one of those presidential submissions. President Bush on January 18, 1991. Bush reported to the Congress "consistent with the war powers resolution" that he directs certain actions. The selection of that word consistent was just a simple error, and you did not intend to put it up there, like other Presidents, to say we will do something consistent, but not comply with, is that correct?

Mr. DOUGLASS. No, sir. Let me be unambiguous in my answer.

Senator WARNER. Would you be willing to amend that chart to read that the report prepared by DOD reflects DOD's commitment to comply with the 1996 Defense Authorization Act?

Mr. DOUGLASS. Yes, sir.

Senator WARNER. Fine. So you are going to be in compliance with the law?

Mr. DOUGLASS. Sir, I fought very hard to make sure that the words in the report were looked at from A to Z so that we would be compliant with the law. I think you can validate that from talking to other people.

Senator WARNER. But up here the word consistent has a lot of interpretations.

Mr. DOUGLASS. To the degree you do not like that word, sir, I apologize.

Senator WARNER. You will replace it?

Mr. DOUGLASS. Yes, sir.

Senator WARNER. All right. That is fair enough.

Now, you also said in your opening statement we not only—and I am going to translate a little bit for you—comply with 1996 law "all resources behind the plan." Is that right, all resources, and I have got it copied down here.

Mr. DOUGLASS. Yes, sir. Let me try to explain what I meant to say, Senator. I meant to say that the Secretary placed all the resources of the Department at our disposal in writing this plan. In other words, we worked evenings, we worked weekends to complete the effort.

Senator WARNER. I am talking about dollar resources. It is clear to me and others that there was a decided attempt not to put the dollars behind the program as outlined by the Congress. I and others, and fortunately I think in partnership with my colleagues from Connecticut, will see that that plan not only complies with the law, but is funded to make a clear representation that it is in compliance with the law. That is what I intend to work with here.

Now, we are beginning to get the first reports from the field down in the subcontractor tier, and so forth, and I hope we are in error, but you can go a long way to correct it, that a project called M that is being developed by a small Virginia company, the project manager on the New Attack Submarine program directed the subcontractor hereafter to deal only with the Electric Boat and not Newport News, so would you pass the message down to the contracting tier and the project managers that competition means what it says?

Mr. DOUGLASS. Yes, sir. I have no knowledge of what you are talking about.

Senator WARNER. I did not expect you would, but we can find that individual. I did not want to identify him by name, but we will provide you the name.

Second, the Congress authorized and appropriated $100 million last year for long lead and advance construction and procurement for the 1999 submarine to be built at Newport News. What is the status of the allocation contracts under that?

Mr. DOUGLASS. The bulk of that money, sir, went for the long lead for the nuclear components for that ship.

Senator WARNER. For the 1999 ship?

Mr. DOUGLASS. Yes, sir they are the long lead items for the ship.

We have spent some of that money, I have been told, at Newport News. In addition, there was some $10 million of fiscal year 1996 design transfer money which was also fully committed in order to get the design information moving from Electric Boat to Newport News.

I might add to you, Senator, I have gotten personally involved in this to make sure that the information that flows is correct.

Senator WARNER. Mr. Secretary, I accept those recommendations, and I would appreciate your supplementing the record hopefully within the next day or two to indicate to this committee where you have actively contracted with Newport News Shipbuilding in compliance with that specific congressional directive.

Mr. DOUGLASS. Yes, sir. [The information follows:]

The $100 million Authorized and Appropriated by Congress in fiscal year 1996 for long lead procurement for the fiscal year 1999 submarine to be built at Newport News Shipbuilding has been distributed as follows:

[In millions of dollars]

Long lead nuclear components	86.3
Design Transfer	10.1
Congressional inflation Reduction	0.6
OSD Revised Economic Assumption Reduction	0.7
OSD Bosnia Reduction	2.3
Total	100.0

Of the amounts in the table above:

— $65 million has already been obligated for long lead nuclear components and the remaining $21.3 million will be obligated shortly.

— For design transfer, $9.1 million has been obligated to Newport News. The remaining $1.0 million will be obligated to Electric Boat.

As required by the fiscal year 1996 National defense Authorization Act, $10 million in fiscal year 1996 RDT&E,N funding has been obligated to support Newport News Shipbuilding's participation in the New Attack Submarine design. The Navy ha programmed $35 million in fiscal year 1997 SCN funding to continue the design transfer effort.

Senator WARNER. Thank you very much.

Senator Lieberman asked you, this is about whether or not you agreed with a statement that was made in testimony to be submitted to Mr. Battista, who is seated right behind you, and I will read his testimony submitted to this committee today:

The House-Senate Conference on the fiscal year 1996 authorization act has once again resulted in a compromise that legislates mediocrity.

You are on record as disagreeing with that.

Mr. DOUGLASS. Yes, sir.

Senator WARNER. You are likewise, Admiral.

Admiral LOPEZ. Yes.

Senator WARNER. Admiral, do you likewise understand the word consistent? You have deal with a lot of arms control, and there was no attempt to articulate this message to the Congress in a fashion like that used so often with arms control and other matters.

Admiral LOPEZ. We understand the law, sir.

Senator WARNER. You are going to comply with the law?

Admiral LOPEZ. Absolutely.

Senator WARNER. I will return on a second round, Mr. Chairman. Thank you.

Senator COHEN. Before yielding to Senator Robb, I might indicate for our two witnesses here, you may note perhaps some ambiguity in terms of how words are used on Capitol Hill. Ordinarily, we use words in a different fashion than absolute precision up here.

For example, when we refer to my dear friend—[Laughter.]

—we might mean, my disgusting colleague. [Laughter.]

When we suggest that our colleagues are hypocritical we do not use that term, and we say that they are being inconsistent, but of course we all know that words are but the skin of a naked thought, in Holmes' phrase.

When it comes to jobs and money, semantic precision becomes a categorical imperative, so you are in the state of categorical imperatives, and that is what Senator Warner is apparently insisting upon as we proceed, just so there is no mistake about it.

Senator WARNER. I thank the Chair, and I want the record to show that at one time Battista was my dear friend. [Laughter.]

I assure you, before this program is completed he will be my dear friend. [Laughter.]

Senator COHEN. Senator Robb.

Senator ROBB. Thank you, Mr. Chairman, for clearing up that ambiguity that had troubled all of us with respect to characterizations for such a long period of time. You performed a very valuable service.

Senator COHEN. You are my dear friend. [Laughter.]

Senator ROBB. I was trying to think what connotations might evolve from simple reference to the Chairman as Mr. Chairman. I have decided not to elaborate on the explicit or implicit characterizations that we might draw therefrom.

We have had a number of hearings in this subcommittee and others that dealt with some of the bigger issues and, with all due respect, I am not sure that we have successfully moved beyond the point where we are trying to figure out what works and why, and in what context we ought to approach some of these responsibilities.

Senator COHEN. If you would yield without losing your time, there are two basic issues that we have got to contend with here today. One is the entire issue of competition, which you and Senator Warner and Senator Lieberman have been very intimately involved with in terms of how that is going to unfold and occur, and whether we are talking about real competition and the time frame and how much money has been allocated.

The second one is, what are we competing for? Are we, in fact, spending billions of dollars to push the program into the future? Or are we simply building something that will be relatively obsolete by way of comparison with our counterparts by the time it comes on line?

So that is the purpose of scheduling these hearings, to give the critics an opportunity to come forward, and to give those who are in charge of the program an opportunity to either rebut it or anticipate their comments, and see where we go from there.

Senator ROBB. I thank you for that clarification. Indeed, I would suggest that the second aspect that you just described in the big picture in the long run, putting aside any parochial concerns we might have, is the far more important of the two. I look forward to the other witness' testimony.

My concern continues to go to the question, though, of competition, and whether or not we are serving the taxpayers in the way we proceed. It seems to me that there have been three basic approaches that have been suggested. One was an early competition, which has been ruled out, a second was a late competition, which was essentially the structured deal, and the third was never compete, which was the first proposal that was presented early on. My own discomfort with some of the aspects of any of the three has surfaced from time to time.

Let me ask first of all, in terms of the competition and the analogy to the DDG "competition," how well the "competition" has worked out with respect to DDG procurement, and whether we ought to draw any analogies with respect to the NAS procurement from the DDG procurement.

Mr. DOUGLASS. Over the years, Senator, it is my impression that the competition in various forms on the DDG51 program has been very successful. I do not have the information with me today, but there is material I could provide you.

Senator ROBB. But would you suggest that was, indeed, robust competition, or are we engaging in a your-turn, my-turn——

Mr. DOUGLASS. Sir, when you get down to just one or two builders, using the word robust is somewhat of a stretch. It is as robust as you could make it, sir, when you only have two people who can do it.

In many other aspects of the competition in the Department of Defense we sometimes get five, six, or seven bids. That is what I call robust competition. When you have two people who can build a thing, and you ask them to compete, I do not see how you can make it more robust than having the two of them compete. That is the best you can do when you are down to two companies.

Senator ROBB. For the record—I do not want to get into an extended dialogue here, but for the record, I would like to have some sense of what meaning we can give the word competition in terms of that particular procurement history.

Admiral Lopez, before I ask another question, would you like to respond to that?

Admiral LOPEZ. We are very happy with the way the DDG51 has gone.

To be specific, with respect to competition and management, that ship is far more sophisticated than it was when we started it, in terms of what we have on it, its capability, and it cost no more than it cost originally. So in the sense of funding, management and competition we are very satisfied with it.

Senator ROBB. I really do not want to get into a debate right here and now. I think that any clarification in terms of how we would suggest that this is competition in the sense that most of us would view competition would be useful, at least for me, because I am still troubled by it.

Let me ask if you would put back up the last of the slides that you had, which showed some bar graphs, or something close to being a bar graph.

I am curious with the alternatives you have presented, and with the unanticipated dilemma that you have identified with respect to the specific language occurring in the year 2002, why you would not in effect take and take your box and move it three positions to the left, and then in effect have the essence of the negotiated compromise that was worked out and signed into law, and then competition thereafter, rather than the way you have presented as being an appropriate——

Mr. DOUGLASS. Do you mean, why do we not do a two-boat competition?

Senator ROBB. I am coming to that in just a minute, but the first question I am asking is, why would it not be a fair representation of "the deal" to put your box 3 years over so that the box begins to describe the situation after the second assigned boat, or in the year 2000, and then has EB–1, Newport News 1, and then competition thereafter? Would that not describe the essence of the agreement that was reached?

Mr. DOUGLASS. Originally we thought that is how we were going to construct it, sir, but if you read the law very carefully, it says that after the fiscal year 2001 boat, the next time that you can buy a boat the way the law is structured now is in fiscal year 2003. We feel that is a flaw in the law.

Senator ROBB. Mr. Secretary, I am not really quarreling with your interpretation. I am trying to return to the essence of what was the spirit, if apparently not the letter of what was agreed upon ultimately and asking you if what I just described would not better demonstrate the commitment that everyone thought they had entered into as an opening question.

In other words, it would have given each of the yards in sequence, EB, Newport News, EB, Newport News, and then competed thereafter.

Mr. DOUGLASS. Yes, sir, that could be done.

Senator ROBB. The reason I ask is because all the others seem to put us back into the combat, or whatever, that we thought we avoided.

Second, is there any reason with respect to, again, taxpayer efficiency, why you could not start the competition after the two boats, one assigned to each of the yards?

Mr. DOUGLASS. The idea of starting the competition——

Senator ROBB. I realize that departs from the deal, if you will, but I am asking why you could not start the competition earlier, but for the deal.

Mr. DOUGLASS. We felt that starting the competitive bidding at that point, and I am choosing my words carefully because of Senator Warner's sensitivity about the way I said it earlier, would disadvantage Newport News.

They would have just received a contract for their first boat by the time you asked for bids. We felt that they would not have had time to be in the game long enough to make it a fair competition. When we looked at it very objectively, we felt that you needed to do all four of the boats before you asked for the competitive bids in order to level the playing field. That is the short answer, sir.

Senator ROBB. Again, I am not attempting to open up all the whole can of worms, but if the yards were to be competed before any contract was awarded, assuming both yards were presumably ready to compete, able to compete at that point—I really do not want to debate that at this point, my time has expired.

I will just say that I think that we owe the process a fuller explanation of the benefits that are to be derived, particularly from some of the extended-assignment strategies that are being suggested here, either implicitly or explicitly. I do not challenge the fact that it may well be that both yards would prefer the security of knowing that they had one boat coming online in a particular year.

So I am not attempting to represent the interests of either yard in this case, but to find some rational explanation for why it appears that we are spending considerably more money to extend a process that, given all the other platforms that the Naval Service and the rest of the armed services are going to be requiring in the outyears is realized, I——

Mr. DOUGLASS. This may help to answer your question. Remember that we have not increased the total number of boats in the program at all, it is just a question of how you arrange them.

Senator ROBB. All right.

Mr. DOUGLASS. If you built two and then you go rapidly to rate production, you would be pulling boats forward into the FYDP. Those two would migrate to the left. The expense, in the near years, would be even more than it is now by a very substantial amount. So in balancing affordability and fairness and all of the other factors that we looked at, these were the best plans that we could give you, sir.

The price goes up if you pull those twos to the left.

Senator ROBB. It was not my anticipation—and again, my time has expired—but it was not my suggestion or anticipation that we would be bringing anything forward of the line that you have established at this point, basically, one boat a year, starting in fiscal year 1998.

Mr. DOUGLASS. That is what the plan is, sir, one boat a year, starting in fiscal year 1998.

Senator ROBB. Mr. Chairman, my time has expired. I am going to follow up.

Senator COHEN. As I understand it, Secretary Douglass is simply playing the hand that has been dealt to him. It started off with the Navy saying that the Electric Boat Yard is going to build submarines and Newport News is going to build aircraft carriers. So that is what the Navy started with. We finally ended up in the position where we are going to do one and one and then we are going to start the competition. Apparently Secretary Douglass has indicated that if you start it too early, Newport News comes out at a disadvantage. That may be subject to factual challenge.

Senator ROBB. Mr. Chairman, if I may. I am not as concerned about that as perhaps I ought to be in the eyes of some. If we cannot withstand competition, then it seems to me that our case is too weak to pursue in this basis. Indeed, I have suggested that if we want to compete for CVN or the next generation of carriers, that we ought to do that, too. I am not suggesting single sourcing.

Senator COHEN. It is just at what point do you come in on the competition. If you come in at a certain phase of the competition, you are going to be noncompetitive. I think that is what the Secretary is saying. But you can explore that next time around.

Senator ROBB. I understand that the choice of words is very important here, and I will just leave it at that.

Senator COHEN. OK. Let me go on to something other than competition. Basically, let us go to the second point, and that is the Navy's alleged lack of vision. The charge has been, and there will be a panel that will follow sometime this afternoon, that the Navy is suffering from cataracts. It is vision impaired. It is bureaucracy bound. It has consistently underestimated the threat of our counterparts, and we are spending billions of dollars to stay marginally ahead of the competition. That, in a nutshell, is what I believe the second panel will testify to.

On that line, I would like to ask you, Secretary Douglass, how do you respond to the testimony in prior congressional hearings and today's statements that alternative designs, such as the Collins class and the Royal Navy nuclear subs can be built equal to or close to being equal to our own nuclear Navy submarine with about one-third the cost that we have to pay for one of the New Attack Submarines or the *Seawolf* class?

Mr. DOUGLASS. Senator Cohen, again, I will choose my words carefully. You would not be happy with us had we bought the Collins class. The Collins class went to sea, sir, as I recall, 2 or 3 years ago. Her combat systems do not work as of this day. So if I had bought you a submarine and had gone to sea and we turned on the sonar, it did not work, you would be pretty unhappy with me.

I would suggest to you, sir, that those who take these foreign submarine programs and try to assert that they are even in the ball park with ours, are badly misled. I would certainly ask the Committee to fully investigate the status of some of these claims that people make.

Now, I have to be careful about what I say. I do not mean to denigrate any of our allies. I do not mean to denigrate any of the contractors involved. But people have very badly misrepresented the technical capability of that submarine and their acquisition success. I would be embarrassed if that was one of my programs, sir.

Senator COHEN. Do you agree with that, Admiral Lopez?

Admiral LOPEZ. Yes, sir. We need the best. We are not in the NFL. We have to win every Sunday. Our submarines are moving in the right direction. I think we have got the growth potential to make them even better than they are going to be.

Senator COHEN. Now, one of the reasons that President Bush was cited earlier today in talking about consistently with the War Powers Act, but when President Bush cancelled the *Seawolf* program, he did so based primarily upon the fall or the collapse of the Soviet Union, the diminished threat, or at least the perceived threat at that time, and the need to have a submarine that costs less money than the *Seawolf*. In order to achieve lower costs, the Navy had to do what? It had to reduce speed, depth of operation and other types of capabilities in order to achieve a lower cost, did it not?

Admiral LOPEZ. Yes, sir, that is true. Let me talk a little bit about the requirement.

Senator COHEN. Let me finish. The next question would be, then, as Mr. Polmar has made the point, that Western analysts over the years have consistently underestimated the ability of the Soviet Union, and now even the Russian Republic, to leap ahead and catch up with Western quieting techniques and design techniques. If you take into account the fact that we have had to cut back the costs, which have in fact—had to compromise some of our capabilities, how do you then address the issue of how we maintain the superiority in the future, based on the plan for the *Seawolf* or the follow-on to the *Seawolf*?

Admiral LOPEZ. Sir, I think—without getting into classified data—we have to accept the estimates of our intelligence agencies. We do not just use the Navy intelligence estimates. We use all that are available to us. I know you have seen all of them.

Senator COHEN. But those intelligence estimates have been consistently deficient in the past.

Admiral LOPEZ. In some areas, yes, sir. But, nonetheless, I think our technology is superior. I do not how quiet you can get a submarine. Based on what I know with the intelligence estimates, I know that our New Attack Submarine will be the quietest. It is just as quiet as the *Seawolf*. It is going to have enough speed. It is going to have enough depth. It is going to have superior sensors. It is going to have the best fighting sailors in the world. I think that is what makes the difference.

Senator COHEN. How about weapons load?

Admiral LOPEZ. Weapons load is slightly decreased, but it is going to be good enough. We, also, as I have said, have put in the modularity concept, so that if you need another package of Tomahawks, if the world evolves in that direction, we can do that.

Senator COHEN. Were the tradeoffs that were made, in your judgment, cost effective? Specifically, what we had to give up in terms of the cost of the follow-on, is that something that you believe is in our best interest—speed, depth, load charges, size?

Admiral LOPEZ. Regarding cost-effectiveness, it is going to be a very capable submarine that is the best that money can buy for the price that we have on it. Therefore, I think it is very cost effective?

Senator COHEN. Would you, Secretary Douglass, offer comment concerning the value of developing—or the use of operational prototypes to develop and incorporate new technologies? That is also part of the DOD conference report, that we are to use operational prototypes.

Mr. DOUGLASS. Yes, sir. The term "operational prototype," Senator, is a relatively——

Senator COHEN. Ambiguous.

Mr. DOUGLASS.—ambiguous term. Yes. We are all being sticklers here for terminology. It is very difficult to build a full-scale operational prototype without approaching the cost of a full-up system. What is the difference between, say, the first boat in a class and a, quote, operational prototype?

There is some inference, I suppose, in linking those two words together. In the normal sense of a prototype is you do not build logistics into it, you do not build the maintainability into it, you do not build a lot of things into it that you would into the first ship. Then you have to go and operate this thing and you do not have the logistics for it, and you do not have maintainability for it, you do not have all the other things you need to make it go.

There is kind of a non sequitur to this. I think some of the people who are using that phrase are people who have never had to operate submarines and they do not really understand how it works. There have been some successes in the past and there have been some monumental failures in trying to do operational prototyping with submarines. We could provide you some statistics if you desire more information.

Senator COHEN. Well, what do you intend to do?

Mr. DOUGLASS. One of the things that we can do, in terms of prototyping, is we can prototype subsystems, and also do some small-scale prototyping. We do intend to do that, sir. But this plan that we have presented to you is not an operational prototype plan. This is a lead-ship plan with a leader-follower competition.

We plan to take that lead design, move that design back and forth between those two yards. Using the innovation in both of those yards to improve it. Using the innovation from our Naval laboratories, from our great academic institutions, wherever we can get the technology to infuse into that boat. We will give both contractors full access to that technology, allowing them to recommend changes. The Navy will choose the very best ideas and incorporate them into whichever boat we can get them into and also in the serial design in a way that allows us to stay ahead of whatever our requirements people define as the threat.

Senator COHEN. So, basically, we should not expect to see four boats out there operating at sea and being tested for the new technologies?

Mr. DOUGLASS. No, sir, you should not. If I interpret what you mean to say, those are not four prototype boats. Those are the first four boats of a serial design. Each one will be better than the last, because we will infuse more technology into them as we go down. Both yards will have full access to that technology. So the third one will build on the second one, the fourth on the third, and so on.

Senator COHEN. Senator Lieberman, you are next, but could I just defer to Senator Smith? We have all had our first round. We are starting on our second round now.

Senator SMITH. Thank you, Senator Lieberman. Thank you, Mr. Chairman. I just have a couple of quick questions which are probably appropriate to you, Mr. Secretary. I do not know if Senator Cohen touched on the question of infrastructure or not but if he did, I can stop the question. Is the infrastructure for submarine repair that we have now at Puget, at Pearl, at Portsmouth and at Norfolk too much infrastructure for 50 SSN–688 class submarines?

Mr. DOUGLASS. You are hitting me cold here, and I like to give straight answers, Senator Smith. Joe, do you have a feel for that? I am not trying to avoid answering your question but, frankly, I have not looked that carefully at the infrastructure.

Senator SMITH. Let me just give you a little bit of background regarding my concerns. What we are hearing from these repair yards and overhaul yards is that a lot of adjustments have to be made. For instance, there is a lot of lateral movement among crews. This is certainly happening at Portsmouth and at Pearl Harbor, where people who might be pipe fitters may have to be an electrician temporarily or learn another trade to adjust as the downsizing continues. When this happens, I think you get to the point where you cannot really function as a public repair yard.

I guess that is my question. Do your future plans include all four of those facilities doing the work?

Admiral LOPEZ. Yes, sir, let me just comment on that. One of the driving factors in this, from my perspective, even though I am in the requirements business, is that we have downsized almost 40 percent of our force structure, including submarines. So we are finding this in all of our yards, where we are taking out all the old ships that would have received recurring repairs. So, therefore, the age, if you will, of the force has come down.

I think you are going to see this for the next couple of years or so, these peaks and valleys in maintenance and repair. That should level out. We have no intention of changing any of our approaches to the shipyards.

Senator SMITH. I think what you just said is exactly correct. My concern, though, is that with the technology, with the 688I's being more sophisticated and, the need for overhaul and the need for repairs lessened because of new technology, at some point in time, will we bottom out? Or, do we continue to draw down these highly skilled work forces, at Norfolk, at Pearl, at Portsmouth and Puget Sound, to the point where it no longer becomes feasible to have four of these repair yards?

I mean, it is a question that comes up. I have talked to colleagues who represent these areas, and there certainly is legitimate concern there. I guess the question is: How many submarines of the follow-on technology to the 688's is enough in your future projections? Because at some point in the future, although I know we are looking at 50 to 55 or 45 to 55, you are not going to build 50 more *Seawolf*s.

The question is: At what point are we going to be deficient in the number of submarines that we are going to need for all the littoral things that are being talked about here under the Sea Dragon and other advanced programs that are being discussed?

That is my question: Is it enough submarines? If so, how many is enough? Are you going to see a dip when we get to the point where we do not have enough submarines to fill this gap as these older 688's leave us and we begin to integrate the new ones into the system?

You are only going to put, what is it, three *Seawolf*s? Beyond that, are you filling that gap with enough 688I's or follow-ons to keep that 50-submarine fleet level? If so, does it need to be level, or should it be higher?

Admiral LOPEZ. Yes, sir. As the requirements officer for the Navy, let me just say one sentence before I answer the specific submarine question. The Navy is smaller than it was in 1938 today, and we are still taking out some more ships—primarily submarines. We are going to get down to about the 51 level, 51–52. We are not going to conduct business the way we do today. In fact, today, and for the last 2½ years, our OPTEMPO has been up 25 percent, both in ships underway and ships deployed.

We are going to have to make some adjustments in meeting requirements, with this 40-percent-less force. How that impacts the shipyards, right now I cannot ascertain, because I do not think the full impact is going to be felt in maintenance and repair until about 2000. That is why I said, for the next few years, that you are going to have these ups and downs or peaks and valleys.

We will settle out about that point. We are going to have to continue to build ships. Even if we build our submarines to last as much as 40 years, we are going to have to build more than one a year in order to maintain the force levels that we need. I think we are going to have to just respond to the threat.

But for what we see of the threat between now and the next 15 or 25 years, we think the 50 number is about right. If we were to satisfy the CINC's fully, then I need 67 submarines to keep those ships fully employed for the CINC's in the mission of forward presence and forward engagement, ready to respond immediately to crisis, and transition instantly from peace to war. Because that is the hallmark of the whole Navy, and that includes submarines.

Senator SMITH. I do have just one more question. As you look at the competition that is emerging in the world's waters, other than Russia, do you see anybody competing with us or coming close to competing with us in stealthiness and acoustics in submarines? The Russians as well, do you see them being able to compete with us in those areas?

Admiral LOPEZ. Again, stealthiness depends on where you draw your line, at what speed. There are various parts of that equation, if you will. But I think that we still have to move ahead in stealthiness, but, even more so, we have to move ahead in sensors. We have to invest our money in technology in both areas. We cannot forget one. The submarine is a weapons platform, and it if it is queued properly, it can kill other submarines more readily. It is certainly the best antisubmarine system that we have.

Senator SMITH. Is anybody working on stealth technologies?

Admiral LOPEZ. Yes, sir.

Senator SMITH. Other than Russia?

Admiral LOPEZ. Yes, sir.

Senator SMITH. We can get into that.

Admiral LOPEZ. Yes, sir, I can defer to the Secretary for that.

Mr. DOUGLASS. Senator Smith, I would also add when you compare our submarines to other countries' submarines, you can gather intelligence information on how quiet the other ship is. In other words, there are ways, by getting close to them in various ways, you can listen to determine what they are and you can find out how quiet they are.

What is very, very difficult to do, though, is find out how good their sensors are and how good their signal processing is aboard their ship. Admiral Lopez pointed out another thing: how good they manage the information from those sensors, once it gets aboard the ship. This is very difficult for intelligence analysts to estimate.

So when you look at the full equation—and I think Joe used the terms quieting, signal processing, crew training, doctrine, and so on—when you add it all up, we feel, especially in this program, we have got a very, very good program. But some of the estimates on how other people are doing is very difficult to get. Because you just do not know what they have and how well they have tied things together.

Senator SMITH. Obviously, though, that dictates what we do with the advanced technology and the follow-on technology.

Thank you, Mr. Chairman.

Senator COHEN. Thank you, Senator Smith.

Senator Lieberman.

Senator LIEBERMAN. Thank you, Mr. Chairman. I'm not going to use all my time here. I am glad I yielded to Senator Smith, because I think he brought us back to some basics, which maybe we forget, as to when we are dealing with the here and now. The fact is that we have reached a policy conclusion which is really based on fact, because a lot of what we are doing here is very realistic. We simply need to build more attack submarines, even to keep the level of 51 attack submarines that you are talking about. So the question is: How do we do it within the resource limitations we have got?

I thought, Admiral Lopez, and I do not mean to put words in your mouth, but the truth is we were spending more money for the *Seawolf*, and we were getting more on that boat than we are going to get on the New Attack Submarine, although we have come pretty close to trying to achieve as much as we can. The New Attack Submarine is a more cost-effective boat. I understand that. So we have done that. The plan that you have given us, with the alternatives you present, is very realistic, as well, once we make the policy judgment that we are going to have two yards building submarines. We are going to have the benefits of competition. But you have got to keep both competitors working.

This is not the days of the eighties, at the height of the Cold War, where we were building three or four submarines a year at a yard. That is why that 2002 gap for Electric Boat becomes so important to fill.

I think it is funny how you get sniped at from both sides here. There are a certain number of people who feel we are overbuilding submarines, that we are overestimating the threat level. In a way, the critics on the second panel, at least some of them, acknowledge the threat level. In other words, they are worried that we are not adequately meeting the potential threat, as opposed to those who would have us do I do not know what. Close up shop? Stop building subs? Or take a breather for a while.

So I think you have put together, Mr. Secretary and Admiral, a good, solid plan here. I would just like to read from your closing—we received this on Under Secretary Kaminski's letterhead, but I assume, Secretary Douglass, this is really your work in the report.

Mr. DOUGLASS. It is truly a collaborative work, sir. We submitted a plan down to the Office of the Secretary of Defense and the Office of the Secretary of Defense helped us improve it. What you see there represents a consensus of the entire Department of Defense. It is fully compliant with the law.

Senator LIEBERMAN. So just to pick up Senator Cohen's point that we are inquiring on—and this is a point of concern on the second panel, I gather—which is that you are convinced that we are doing enough when it comes to submarine within this plan to not just keep up with, but to keep ahead of the competition in the next period of our history?

Mr. DOUGLASS. If we are able to execute this plan, we feel very comfortable that we will maintain the undersea superiority in our submarine force that we need to protect our national security interests, yes, sir. There is clearly going to have to be some additional work with the Congress to realize the funding required to fully implement that plan and we are committed to do that, sir.

Senator LIEBERMAN. I appreciate that. I would read briefly from the closing paragraph of the report, which I think is very strong: "The New Attack Submarine design will yield a cost-effective ship, providing the nation with technologically-robust, highly-capable, multi-mission submarines which meet 21st Century operational requirements."

Thank you.

Thank you, Mr. Chairman.

Senator COHEN. Senator Warner.

Senator WARNER. Thank you, Mr. Chairman. I will try and be brief so we can proceed to the next panel. By necessity, I will have to miss part of the testimony of the next panel, but I have had a chance to examine these statements. Mr. Chairman, without being presumptuous to your role as chairman, I would like to ask that the Department of the Navy give this committee a side-by-side with regard to a number of very important points raised by Messrs. Polmar and Battista. I want to know what the Navy answer is to some of their very important points.

Mr. Polmar and I served together in the Department of the Navy many years ago. Mr. Battista and I faced off against each other when you were one of the most effective staff directors ever in the history of the House. But I say that, in reading your testimony, I would caption your testimony as "The unbiased history of the New Attack Submarine, from the House point of view." But, nevertheless, it deserves a good, tough side-by-side.

Senator COHEN. I would say, as a result of Senator Warner's characterization, your consulting fees are bound to skyrocket.

Mr. BATTISTA. Senator, I was out riding my Harley when I got a phone call to get back involved in this thing. [Laughter.]

Senator WARNER. You have done a good paper here. As I said in a previous hearing with the Navy, it is my hope and expectation to succeed this distinguished chairman next year as chairman of this subcommittee. So I want to continue this program throughout, hopefully, my next term in the Senate. I would like to have as a part of this important record, a side-by-side on these two valued contributions.

Now, Admiral, again, going back to the good old 688 program, which much of it was laid down, the foundation, in my tenure in the Department. The other day I went aboard a 688, one of the newest. I asked the commanding officer, a very knowledgeable individual, as to the percentage of change between submarine number one and the last that will roll off the line.

The question was asked because in the constructive criticism of the next panel, they say the Navy is not incorporating the advancement in technology as it becomes present. I think the 688 program is an example of how we have kept pace with the advancing technology, in terms of modification at the time of new construction and retrofits.

Could you give us a generalization of the quantity of change, and then provide for the record a more detailed answer?

Admiral LOPEZ. I was trying to think of the exact percentage of change, and it is very high and, frankly, not unusual in the way that we design ships. I did allude to this in earlier testimony that is the way we have designed the New Attack Submarine—with growth potential—to be able to use the cost-effective COTS, commercial Off-The-Shelf technology. I think that the New Attack Submarine is going to be reflective of exactly what you saw in the 688.

If you look at the tenth one, it is going to look far better than the first one.

Senator WARNER. Well, I think that percentage is well over half, would not you say, Admiral?

Admiral LOPEZ. Yes, sir, I know it is. I just do not have the exact percentage.

Senator WARNER. If you could provide that. I do not have it here with me either.

[The information follows:]

Based on a review of the major shipboard systems identified in the SSN 688 Class Maintenance Plan, more than 60 percent of these systems have been upgraded from the first SSN 688, including all war fighting and propulsion systems. These upgrades have fully utilized the margin originally provided in this ship design.

Numerous upgrades to take advantage of improving technology, or to improve war fighting capabilities in response to the changing world threats, were incorporated into the new construction process. Some of the more significant modifications enhanced the propulsion plant, the combat and communications systems, the sonar systems and the weapons and armament capabilities. Specifically, virtually the entire propulsion plant has been modified, decreasing the weight of the system components and increasing power output. Improvements to the reactor plant have resulted in a virtually life-of-the ship core and improved acoustic performance.

Command and control systems including the acoustic systems, weapons fire control systems and communications equipment have been significantly upgraded to take advantage of improvements in commercial technology such as fiber optics, digital technology and information processing. The Los Angeles class submarines have been modified to carry a wider range of weapons including addition of twelve vertical launch missile tubes and increasing the capabilities of the horizontal torpedo tubes to launch a full range of missiles and other weapons. Significant modifications were also accomplished to enhance the ships ability to operate under the ice of the polar regions.

While many of these improvements have been retrofitted into earlier ships of the class, technical and financial limitations have prohibited the retrofit of all the improvements across the class. Further refinements will be made over the remaining life of this ship class, however, the fundamental ship performance is limited by basic ship design—now nearly 30 years old.

Senator WARNER. Again, Admiral, I would like to direct your attention to alternative number 2. Is this alternative an attempt to bring greater stability to the New Attack Submarine program like you have in the DDG51?

Admiral LOPEZ. Yes, I think it will bring greater stability. Yes, sir.

Senator WARNER. I think we should follow on the earlier questioning by my colleague, Senator Robb—has not that competition that you built in DDG51 resulted in a savings to the American taxpayer?

Admiral LOPEZ. Positively, yes, sir.

Senator WARNER. Positively?

Admiral LOPEZ. Yes, sir.

Senator WARNER. Mr. Secretary?

Mr. DOUGLASS. Yes, sir.

Senator WARNER. Secretary Douglass, in referring to last year's legislation, Congress authorized and appropriated additional funds for the development and demonstration of advanced submarine technologies. Congress specifically directed the Director of DARPA, the Defense Advanced Research and Projects Agency, to implement this program in concert with the Navy and the two shipyards, correct?

Mr. DOUGLASS. Yes, sir.

Senator WARNER. Now, what has been done to this point to implement the Congressional direction?

Mr. DOUGLASS. Sir, I do not speak for the Director of DARPA. It is my understanding they are organizing their fiscal year 1996 program to comply with the direction that you gave them.

Senator WARNER. Well, we are well into 1996, Mr. Secretary.

Mr. DOUGLASS. Yes, sir. As you may or may not know, Senator Warner, I testified before the Acquisition and Technology Subcommittee with the Director of DARPA. During that testimony, I made it clear that I felt that DARPA had a significant role to play, that they should remain in the submarine technology business. The Director felt that they should move out of the submarine technology business. So we have a difference of opinion.

My judgment is they should comply with the law, sir.

Senator WARNER. Have any contracts been signed with the shipyards, both yards?

Mr. DOUGLASS. Sir, I do not know the status of DARPA's contracting. I would be glad to look into that for you.

Senator WARNER. Who is your senior man at DARPA that you deal with?

Mr. DOUGLASS. The Director is Dr. Larry Lynn.

Senator WARNER. Is he the one that is in charge of this?

Mr. DOUGLASS. Yes, sir.

Senator WARNER. You feel that DARPA ought to keep it going, and the Navy should not be in charge of this program?

Mr. DOUGLASS. Sir, you may recall there was a bullet on one of those charts for an oversight council. We felt that of the $60 million a year of additional research and development that we need to do in submarine technology. About $30 million extra should go in the Navy and $30 million extra should go in DARPA. Those two programs would be coordinated through this oversight council that

I and Dr. Kaminski would chair. Dr. Lynn would sit on the council. We would then have some visibility into what they are doing and they would have visibility into what we are doing, and we could fully coordinate it.

Senator WARNER. I would hope that you would take my question and review it and supplement your testimony in the record for me, because I am very anxious to follow this.

Mr. DOUGLASS. Yes, sir. I would be glad to do that.

[The information follows:]

The Defense Advanced Research Project Office (DARPA) will continue to play a significant role in submarine technology development and oversight. The Director, DARPA, is a principal member on the newly formed Submarine Technology Oversight Council.

As required by Section 131(i) of the fiscal year 1996 National Defense Authorization Act, DARPA will obligate $100 million in fiscal year 1996 RDT&E funding to develop and demonstrate advanced technologies for incorporation in future submarines.

Senator WARNER. Thank you, Mr. Chairman. I will return shortly.

Senator COHEN. A couple of quick points and then we will conclude the first panel.

Admiral Lopez, why retire the Los Angeles when it has got about 10 or 12 years longer of life service? Why not convert them rather than retire them, and simply use them for either strike warfare, deep-sea search and recovery? Why is not that a better option than putting them away?

Admiral LOPEZ. We would love to keep more ships in service, sir. It is really a matter of affordability for us. As you know, we are recommissioning FFG's and SPRUANCE-class destroyers as well. We think that the BUR level of forces is about right to meet the requirements that we have with the CINC's. If we had the opportunity, we would probably keep more ships—and we had the money, if nothing else, to lessen the OPTEMPO. But, in any case, I think the Navy is sized about right to do the job today.

Senator COHEN. Secretary Douglass, this question refers to the whole issue of the insertion of evolutionary technology into the New Attack Submarine Program. During the course of the last year's conference, when the issue of evolving technologies came up, the Navy came to us with several pages of new technologies they indicated would be able to be inserted as we went along. Then, as we looked at these several pages of proposed technologies that would emerge or mature, we looked at the funding levels and there was no money in fiscal year 1996 and there was no money in the FYDP for any of these emerging technologies. So it seemed to be a fairly blank page as far as the Navy's intent to insert these new technologies as the program evolves.

So why should we give any credibility to the Navy's statements on this, if there is no money in the FYDP for it?

Mr. DOUGLASS. I was not here last year, sir, to impact the budget development process. But we have tried to identify a new list for you. We have broken it into various categories to help the Committee analyze it. I guess the proof would be in the pudding, when we submit our next budget, sir. That is where you are going to gain or lose your confidence in us on that regard.

Senator SMITH. Mr. Chairman, could I follow up on a point that you just made?

Senator COHEN. Sure.

Senator SMITH. I know you want to move to the next panel, so I will be very brief. To follow up on Senator Cohen's point about taking the submarines out of the fleet, Senator McCain spoke on the floor last year regarding that matter. I believe his point at the time was that there were 83 688 subs still in the fleet, and that the Bottom Up Review stated that the long-term requirement would be 45 to 55, which is what we are moving to now.

But, what is the rationale for taking a submarine that has 18 years of service life remaining and scrapping it when you could overhaul it and save millions if not billions of dollars in that process? Is the reason because you cannot do the acoustic technology? What is your reason for it? It does not make any sense to me.

Admiral LOPEZ. Yes, sir. As we have said earlier, we need to move ahead. The 688I is a very capable ship. We are in fact overhauling 13 of those ships, as I recall.

Senator COHEN. How many 688's do we have? Eighty, is it not?

Senator SMITH. About 80.

Admiral LOPEZ. I do have the figure. It is 23 688I's and 27 688's. That is the count that I show here now.

Senator SMITH. What are the rest of the submarines?

Admiral LOPEZ. We need to build the ship that is going to be able to compete in a warfare environment in the 21st Century. Second, we are only going to keep those which we need to meet the threat as we see it today. Obviously, a reconstitution of Russia or something like that would cause us to rethink this. It is simply a matter of affordability versus numbers, sir.

Senator COHEN. Staff has just apprised me that in the budget request, the figure of 80 is what the Navy had submitted as far as SSN's. So we seem to be missing some boats here.

Senator SMITH. Yes. I have 80 also. That is the number I have.

Admiral LOPEZ. We have a couple of 637's.

Senator COHEN. Right.

Admiral LOPEZ. We have the 3 *Seawolf*s that are being built.

Senator COHEN. That still does not add up to anywhere near 80, though.

Admiral LOPEZ. Well, we have the *Tridents*. They may have included those. Let me give you a complete count. I just got these right before I came over, and that was a total of—well, I was answering the question for 2000. You wanted to know today? I am sorry. My apologies. I gave you the count for 2000. Your number is correct, yes, sir, for today.

Senator SMITH. Eighty-three is what I have as of May 1995.

Senator COHEN. Admiral, just a final point. You, on several occasions, talked about the need to discuss some classified information about the superiority that would be achieved with the *Seawolf* and follow-on submarine programs, and we will need to have that briefing in order to make an assessment on the charges about the marginal superiority that would be achieved according to the graphs that have been presented. But we will also need that briefing at some future time.

Admiral LOPEZ. Yes, sir.

Senator COHEN. I have a series of questions that I will ask both of you for the record, and we will conclude this first panel. Thank you both for being here.

Mr. DOUGLASS. Thank you, sir, for your evenhanded approach to this.

Senator COHEN. Our next panel, if they will come forward. We have, as I indicated previously, Mr. Tony R. Battista, who is a private consultant and former Staff Director, the House Armed Service Committee. We have Mr. Norman Polmar. He is a well-known author, historian and analyst of Naval affairs, and we have Dr. Lowell Wood, who is a Visiting Fellow from the Hoover Institution on War, Revolution and Peace at Stanford University.

The committee was apprised of your testimony you presented last year to the House National Security Committee. We found it very helpful, however, we realize that we did not have the benefit of having a dialogue. Your testimony to the House led to a good deal of debate during the conference that we had with the House. So we want to take this opportunity to ask you to make a presentation today so we can have the benefit of those ideas as well.

So we would ask you to summarize your statements. If you have prepared statements, they will be included in the record. If you can give a summary of the issues we have been discussing, be it on the current procurement of the *Seawolf*, conversions of 688's, and whether or not the American people are going to get a good return for their investment as far as the follow-on to the *Seawolf* itself. I think those are the two or three areas we would like to cover during this panel.

Mr. Battista, do you want to proceed?

STATEMENT OF ANTHONY R. BATTISTA, PRIVATE CONSULTANT

Mr. BATTISTA. Thank you, Mr. Chairman. Thank you for the invitation to come before you here today.

I submitted my statement to you and, with your permission, I would like to have it inserted in the record and not read from it, but just give you a brief assessment.

Senator COHEN. It will be included in full.

Mr. BATTISTA. Thank you.

I have been in the defense and aerospace business for some 38 years. I was thinking the other evening that 23 of those years were dedicated to tracking this whole area of non-acoustic and acoustic antisubmarine warfare and submarine technology. When I came to the committee, it was the end of 1973. There was an individual I was talking to at the time who was then known as Navy Secretary Warner. Later, we got into the subject when he became Senator Warner.

Over the years, I have made a number of observations, one being that at this time, it is my opinion that the Soviet capabilities in submarine and antisubmarine technology, if anything, were underestimated by the intelligence community. If you recall, back in the year when I first went to the committee, we did not have a House Permanent Select Committee on Intelligence. At the time, that was part of my responsibility. So I would track the national intelligence estimates and what the Soviets were doing, and basically compare that to our research and development program.

I believe if I were to retrieve all of the documents that I tracked over the years, I can prove to you beyond a reasonable doubt that that is the situation today. I also believe that the Akula is the quietest, acoustically and non-acoustically, submarine in the water today. All too often, the Navy puts emphasis on Soviet improvements over the years. I am more concerned with the rate of change that leads to those improvements. They were literally experimenting with submarines and throwing them away, a luxury that we did not have in this country.

I think if you look at all of the signature data that we have in our archives, you will find that the Akula is in fact the quietest boat today. I further concluded that our submarine program was under-funded in technology and in fact in the types of submarines we were building. I also believe that we were paying too much for submarines. I do not share with you the assessment on the *Seawolf* that led to its termination at the end of three boats.

Senator, you picked up on my comment about legislating mediocrity. That is not the first time I used that statement. I used it with Senator Warner back in, I believe it was 1985, when I was very critical of the *Seawolf*. I said at that time, Senator, we are legislating mediocrity in this program. Why? Because we were trying to encourage the Navy to proceed with open architecture for the combat systems. This was a well-known technology at the time. They would not do it.

They were building something called an enhanced modular signal processor, an array processor, a large number cruncher. We said, There are commercially available array processors like this that you can buy off the shelf. They did not do it. We wound up adding $100 million for a program called Advanced Submarine Technology, which should have been the New Attack Submarine at that time.

Let me bring you up to date now with regard to the New Attack Submarine, and offer an opinion different from Secretary Douglass and Admiral Lopez. I looked at the program last week, at the Navy's request. I spent 4 hours with them. I think they have done an absolutely remarkable job in transitioning from the classic or traditional way of building submarines to a modular approach, with open architecture, with acoustic quieting, and they have done a really good job.

I am concerned. I have got some concerns, for example, over the re-hosting of 50 percent of the combat system software that could, in my opinion, lead to a constraint on the open architecture. I also think it might be a more expensive approach. I am not sure about that. It was just based on a 4-hour review and what I had discussed with Admiral Frick. We are going to get together at a later date to discuss that further.

What really troubles me, however, is the fact that there is absolutely no consideration, or very little consideration, to hydrodynamics. I used in my statement an analogy that if you wanted to build a truly stealth aircraft, you would not start out with an F–16 or an F–18. You would start out with a clean sheet of paper. That is the way you get your geometric faceting and your coatings and everything else to give you the cross-section that produces very low observability.

In the case of a submarine, you have to design acoustic and non-acoustic quieting in at the outset. Non-acoustic quieting is not something that is an afterthought.

Let me give you an example. I am going to read to you from documents from 20 years ago, written by Russians: "Various methods are being tested for laminarization. Feeding compressed air between the hull of a submarine and the outer, porous plating, the microbubbles form to reduce drag resistance by 50 to 90 percent." They go on about including making lengthwise grooves in the surface of the hull that resemble the skin pattern of marine life, and creating a flexible coating, capable of dampening the pulsations of the boundary layer. That is what I am talking about when I talk about hydrodynamics and non-acoustic quieting.

I will give you an analogy. I can have the world's quietest shoes. I can control my body motions so that my knuckles do not crack. I can control my rate of breathing if I were going to try to break into your house. That is the acoustic quieting side of it. But then I come into your house with a flashlight.

Well, the weak link is the fact that I am advertising myself. When you are building a submarine, submarines, just like aircraft, generate these vortices. These vortices can be used to your advantage. They can also be used to track you. Submarines generate internal waves. These internal waves, we now know, can be tracked by synthetic aperture radar. We have a U.S.–U.K. program ongoing right now to address those issues.

So when you talk about technological or technology robustness, and the Secretary says, yes, this will be technologically robust—no, that cannot be the case in terms of non-acoustic considerations. You have to start from the beginning. We are not doing that now.

Senator COHEN. Have the Russians started from the beginning?

Mr. BATTISTA. Yes. In fact, I gave a photograph, Senator, to Bruce van Vorst, I believe when he was back at *Newsweek*. It was a photo of the Mike. The Mike had no bow wave. It started a third of the way back of the ship. If you take the Soviet literature and try to correlate that with what we have seen, it becomes readily apparent that their turnaround time is about 7 years. They start an experimentation. You read about it in the literature. Then you see it on their submarine. That is very worrisome.

I believe you will find from the Admiral Baciocco panel, one of the priority recommendations they make is to invest more in hydrodynamic technology.

We have had these good things happening, I believe, since last year. The fact that Secretary Douglass was taking over, and really has put in an extraordinary amount of time on this program. He convened this panel. This panel was made up of the best minds that I could think of in the community. They have done an outstanding job.

But, Senator, when I say your legislating mediocrity, you are going to find that the money for the technology is not there—for the technology insertion. Because it always comes down to a matter of priority relative to an initial operational capability date. I find it incredibly shameful that we put $10 billion into the *Seawolf* program and stopped it at three boats. What I am suggesting to you is, please, do not let that happen again.

First of all, face reality. The New Attack Submarine will not cost you $1.5 billion. It will probably cost you between $2.5 billion and $3 billion. Do you want a data point on that? The design-to-unit price on the *Seawolf* was $1.3 billion a copy, and I believe we are paying $3 billion for it now.

There are other comparisons made that I do not agree with. For example, the Secretary pointed out that the Collins class submarine combat system is something he would not be proud of. I would not be proud of the fact that we had a $908 million overrun in the ANBSY–2 combat system for the *Seawolf* in just 1 year. I think you might remember that, Senator Cohen.

The fact is that the reason we do research and development is we do not have a perfect process and we do not know how to do it right the first time. I would never advocate—I agree with John Douglass—never advocate using the *Collins* class combat system in our contemporary submarines. The point I was trying to make with that analogy, however, is how can these people build a combat system from "wet end" to software for less than $100 million and it takes us $3 or $4 billion to build a combat system for our submarines?

All I am suggesting is that the technology is out there to do things cheaper, and the Navy has historically not capitalized on that.

So in terms of technological robustness, in terms of low cost, I would say we are not there yet.

Senator COHEN. Could I interrupt again?

Mr. BATTISTA. Sure. Please, sir.

Senator COHEN. How do we know what the Soviets, or the Russians, are spending in order to produce this innovation? When we say we are trying to do it cheaper—we are trying to do it better. There is a tradeoff there in terms of cheaper.

Mr. BATTISTA. Sure.

Senator COHEN. What do you have to tradeoff to get the capability? So we are trying to do it less cheaper, but better. We do not have any benchmarks, do we, in terms of what the Russians are doing to achieve this breakthrough compared to what we are doing, or do we?

Mr. BATTISTA. I think we have some benchmarks. I think the fact is they are very open to wanting to exploit the technology. I will give you an example. In the United Kingdom, they were working on gas bubble technology to preserve an oil rig that was next to one that they wanted to take down. So they ran some piping. They generated the bubbles. The bubbles surrounded the rig that they wanted to protect. Well, they took down the other one, and the one they wanted to save was invulnerable to blast effects.

Well, the Russians have written in the open literature over the years the advantages of gas injection into the boundary layer. What does that give you? If I put these bubbles into the boundary layer, one, I become relatively immune to a blast; two, I can use those bubbles for quieting; three, I can use those bubbles to reduce drag, giving me a speed advantage. So I do not have to put all of this power into the propulsion plant.

Just by understanding what the boundary layer does and that phenomenology, I can take those vortices—and by the way, NASA did this in a program called, I think it was, the X–31, where they actually took the vortices and spun them back toward the fuselage to gain added lift. Well, there is a corollary to that in terms of submarines. The Navy does not look at that. The Navy has not looked at that.

I guess the best comparison I can make, Senator, is the Russians have shown us how good they are. The U.S. Navy tells us how good they are. We have built some very find technology. But I am worried. I am worried that the threat is far more severe. I think history has been on my side on this point. I have always said that the Soviets, and now the Russians, were better than the U.S. Navy gave them credit for.

Let me give you cases in point. I argued—and you were on the committee at the time—it was in a conference where I said the Alfa is a 40-plus-knot submarine. You had a paper from the Navy saying that it was a 30-knot submarine. OK. The TPK, the turn-per-knot data on the Oscar was greatly underestimated. We were looking at bioluminescence. We saw the Russians deploy experimental sensors. We never looked at it.

But that is a lot of history. Let me take you to where I think we are right now. One, I think the New Attack Submarine design is very good, but limited. I do not think we should cancel the New Attack Submarine. I think we should press on with it very smartly in a competitive environment. I think we will get our money's worth. But it is not going to be good enough.

Accordingly, I would say we would need a follow-on submarine to the new submarine design that is going to let both yards go head to head, and we should brief both yards into the technology and into the intelligence world, and say that this is what we know the Russians have done, here is the literature showing you what they have done, guys, give us your best thoughts, give us your best design.

I do think that we are, again, rushing toward an IOC. We do not have to.

Senator COHEN. What does operational capability mean in terms of the prototype?

Mr. BATTISTA. Excuse me?

Senator COHEN. More specifically, an operational prototype.

Mr. BATTISTA. Operational prototype, to me, would be a design that has been developed but does not reflect the commitment to the first ship of a lead class or the lead ship of a new class. That is what operational prototype means to me. It means being able to feed in technology as it is developed by virtue of its open architecture, in terms of both hardware and software.

I do think the New Attack Submarine does lend itself to that, exclusive of the hydrodynamics. That is where we fail. That is where we fall off the cliff. We have nothing for the future. We do not have the robustness that we need.

I would say let us not focus on initial operational capability, because we are precluding, I think, a lot of capability that is going to allow us to cope with the Soviet, or the Russian, threat.

I do think it is an absolute waste of the taxpayers' money to cut up SSN 688's with 15–16 years of operational life remaining. That is why we do not to rush to an Initial Operational Capability (IOC). Mr. Chairman, do not let anybody tell you that the SSN 688 Improved is not as quiet as the *Seawolf*. It is. You can go back and look at that data and form your own conclusion.

I do think it is imperative that we keep both yards going through the design phase, because in this area right now, the technological challenge is so great. I mean this is not a trivial job—non-acoustics. So I think it is imperative that we get the best thinking of Newport News and Electric Boat.

The mediocrity that I talked about you legislated is based on the fact, Senator, that the Navy is going to take those charts and 4 or 5 years from now, just as Secretary Douglass said in response to one of the earlier questions, I believe from Senator Smith, "Well, I was not here at that time," 4 or 5 years these folks may not be here at that time either, and you are not going to see any technology insertion.

If you believe the Baciocco panel, which I think has done an outstanding job, then you will provide the requisite authorization and appropriation to get those technologies into that New Attack Submarine. I think there is plenty out there to keep both yards going. I think to curtail spending on submarines is really bad economics. Why?

You have a carrier battle group out there. You have got on that carrier about 90-plus aircraft. You have got several thousand lives on that carrier. If you want to enhance the survivability of that carrier battle group, you better have submarines, modern submarines, technologically superior submarines to do that job. I do not think 51 is the right number. I think it is substantially more than that.

Frankly, I am tired of going back over data that shows that Victor-III's popped up in the middle of our exercises. You know when the Navy found out about it? Three, four, five, six weeks later, when they did the data reduction. I mean the Russians are not 10 feet tall, but they are not cave men carrying pitchforks either.

I think this is too important an area for you not to—and I do not mean to offend anyone—act responsibly through legislation—not report language. I would be willing to sit here with the Navy in a classified session and go over 25 years of data with them. Senator Warner asked them to critique our statements. I know you probably do not have the time, but I would love to do that in a roundtable-type forum. If I am wrong, I would like to know about it. I think this whole area is far too important to just proceed in a business-as-usual fashion.

As far as the cost of submarines, I will give you the same example I gave Chairman Hunter. In World War II, a carrier cost about 35 times more than a submarine. Today, we are building carriers that are 96,000 tons in displacement for about $4 billion to $4.5 billion. They are nuclear powered. We are building submarines that are 9,000 tons in displacement. They are $3 billion to $3.5 billion. So we went from a 35-to-1 cost ratio down to 1.1-to-1. Something is wrong. Something is wrong in the way we are doing business.

So I do think that, one, we can compete. We can maintain our margin of superiority over the Russians. We can build submarines cheaper. The New Attack Submarine is a great design, but it is not good enough. I remember telling you that back in 1985 and 1986. Unfortunately, it was documented in *The Washington Post* when I said that *Seawolf* is going to cost a lot more and it is not going to be good enough. Good enough, I do not mean in terms of sensors or weapon systems per se. If you cannot buy enough of them, it is not good enough.

That concludes my statement, Mr. Chairman.

[The prepared statement of Mr. Battista follows:]

PREPARED STATEMENT BY ANTHONY R. BATTISTA

Mr. Chairman, I appreciate your interest in my views on submarine technology and for your invitation to appear before your committee.

I would like to make it very clear that my views on submarine technology and the Navy's attack submarine development program are completely independent—I do not work for or represent any company engaged in these technologies or programs.

You may recall that I was invited to appear before the House National Security Committee last September to share my views on this important subject with the Members of Chairman Hunter's Procurement Subcommittee. I have submitted, as part of my statement to you, a copy of my testimony of last September and ask that it be included for the record.

My views on submarine technology and the Navy's New Attack Submarine (NAS) program are essentially the same today as they were last September. I remained convinced that:

- Russian submarine and anti-submarine warfare (ASW) technology is even more advanced than the assessment provided by U.S. intelligence sources.
- The quietest—both acoustically and non acoustically—operational attack submarine in the world today is owned by the Russians—the *Akula*.
- The next generation Russian attack submarine will pale the *Akula* and represent the Russians' most notable advance in the last decade.
- In terms of the threat, while Russian intent has softened and changed, the capability in submarines not only remains but is getting better.
- The United States is not spending enough on submarine and ASW technology.
- The United States is paying too much for its submarines and in terms of the threat is getting a very poor return on investment.
- The entire U.S. submarine and ASW program should be restructured—in part as proposed by the House National Security Committee—and should be a high priority national program.

The rationale for this assessment is provided in my statement of last September, so I won't spend any time discussing these observations unless of course you have any questions.

I would note that the legislative accomplishments since last September will, in my opinion, do little to ensure clear U.S. superiority in submarine technology and operational capability in the coming decade.

The House/Senate conference on the fiscal year 1996 authorization act has once again resulted in a compromise that legislates mediocrity. The compromise language will enable the legal experts in the Pentagon to stick to the present design of the NAS, pay lip service to advanced technologies and conduct "business as usual".

I gave you this very same scenario in 1986 and it was the same kind of compromise that resulted in over $10 billion worth of expenditures for the *Seawolf* class submarine that you have given up on after building three boats.

Last week I spent over 4 hours reviewing the NAS program with the Navy. I concluded that the Navy team has paid a great deal of attention to detail, that the overall architecture is excellent and the Navy team has done an outstanding job in bringing the NAS to where it is today.

I was troubled to learn that about half of the *Seawolf* combat system software will be re-hosted for the NAS and I am deeply concerned that the open architecture could be constrained by this approach, that best commercial software practices may not be employed and accordingly, we may again be paying too much for a combat system. Admiral Frick has advised me that the Navy team has addressed these issues and we plan to meet at a later date for further discussions.

My most serious concern is the non acoustic—the hydrodynamic—aspects of submarine and anti-submarine technologies that are absent in the NAS design.

You simply cannot design a submarine that could incorporate these technologies in a conventional hull at a later date any more than you could design a conventional aircraft and incorporate stealth technology in the future. Twenty years ago we decided to design and build a stealth fighter—we started with a clean sheet of paper—the F–117 program. We didn't attempt to make an F–16 stealthy.

Today, we know a great deal about Russian nonacoustic technology. We have seen it incorporated in Soviet and now Russian submarines. This is not a trivial technology and its payoff is extremely high. It has payoff in operating speed, depth, survivability, detection and overall performance. *It is absent in the NAS design.*

Mr. Chairman, the present design of the NAS is where we should have been 10 years ago. We knew all about open architecture, modularity, array processors and to some extent nonacoustics. We were Initial Operational Capability (IOC) driven and there was no stopping the *Seawolf* acquisition freight train. Rather than dwelling on the past, I would offer you a proposal for the future.

A lot of good things have happened since last September. We have a Navy acquisition manager—a former SASC staff member—who has taken an extraordinary interest in this program. He started by putting together a panel under Vice Adm. Al Baciocco (retired) to look under every rock in order to turn up the right answer. While I have not been briefed on the specific findings of the panel, I am advised that many of Chairman Hunter's concerns have been validated.

I believe that it is in the best interest of the Navy and the country to:

- continue the development of the NAS since it represents a major transition from a traditional and expensive submarine design era to a contemporary, modular and robust submarine design;
- continue the NAS as a development program but not as the lead ship of a new class;
- initiate the design of a new and revolutionary attack submarine program that will incorporate non acoustic and other advanced technologies—a prototype program;
- explore necessary options—such as 688i's—to sustain the submarine industrial base—until such time as a commitment to the next class of attack submarines is made;
- sustain a two yard submarine industrial base—Newport News and Electric Boat—at least through the design of the prototype submarine;
- provide the requisite authorization and appropriation for the development of advanced technologies—non acoustics, electric drive, etc. that are essential to submarine superiority.

Mr. Chairman, this concludes my statement and I again thank you for your invitation.

PREPARED STATEMENT BY ANTHONY R. BATTISTA, BEFORE THE HOUSE NATIONAL SECURITY COMMITTEE—SEPTEMBER 7, 1995

Mr. Chairman, I thank you for your invitation asking me to share my views on this most important subject of submarine technology with you and the Members of the Procurement Subcommittee.

I'll get right to the point with my personal observations:

- Russian submarine and anti-submarine warfare (ASW) technology is even more advanced than the assessment provided by U.S. intelligence sources.
- The quietest—both acoustically and non acoustically—operational attack submarine in the world today is owned by the Russians—the *Akula*.
- The next generation Russian attack submarine will pale the *Akula* and represent the Russians' most notable advance in the last decade.
- In terms of the threat, while Russian intent has softened and changed, the capability in submarines not only remains but is getting better.
- The United States is not spending enough on submarine and ASW technology.
- The United States is paying too much for its submarines and in terms of the threat is getting a very poor return on investment.
- The entire U.S. submarine and ASW program should be restructured—in part as proposed by the House National Security Committee—and should be a high priority national program.

I would like to put my last observation in the context of what the Congress is proposing in House bill H.R. 1530 and the Senate amendment S. 1026. The emphasis in the House report is on submarine capability, the needs of the fleet with a secondary concern over the industrial base problem. In contrast, the theme of the Senate report focuses more on the industrial base with fleet requirements and submarine capability being secondary or, in my mind, an afterthought.

Mr. Chairman, you, this subcommittee, the Chairman of the full committee and in fact, this entire body should be commended on the bold action you have taken to restructure our nation's submarine program. You recognized that the New Attack Submarine (NAS), as presently proposed, may not be good enough and you initiated a program that1 if properly executed, will provide an NAS that will lead rather than follow its Russian counterpart.

A former Chairman of this committee, the Hon. Mendel Rivers, had a favorite expression "there ain't no education from the second kick of the mule". You knew 8 years ago that the SSN–21 might not be good enough. I have attached a Washington Post article of February 9, 1988 offering my views on this subject.

Post 9 Feb 1988

Departing Hill Specialist Attacks Navy's New Sub

Soviet Progress, U.S. Budget Pressure Cited

By George C. Wilson
Washington Post Staff Writer

A senior House Armed Services Committee staff aide, in a parting salvo before leaving his job, declared yesterday that the Navy should scuttle its planned Seawolf attack submarine to build a better boat, and sink its two aircraft carriers on the drawing board to hold down the Defense Department budget.

Anthony R. Battista, who, for the last 14 years has often infuriated generals and admirals by poking holes in their pet projects as staff director of the research and development subcommittee, said on the eve of leaving his post next month to become a private consultant that the Pentagon must take drastic actions now to keep its budget from ballooning out of control in the 1990s.

> *"We can fix the surface Navy. The real threat is undersea."*
>
> —Anthony R. Battista

If Defense Secretary Frank C. Carlucci canceled some big weapons programs and got really tough on research projects, Battista said, he would not have to take thousands of soldiers, sailors and airmen off the payroll to accommodate the cuts Congress is almost certain to make in the next five fiscal years, just as it has for the last two.

The SSN21 Seawolf submarine now entering development is not good enough to combat the undersea threat posed by rapid Soviet advances, Battista said. The Soviet Akula attack submarine "is the best submarine in the world today," he said. Last year Battista took the lead in persuading the House research subcommittee to cancel the Seawolf and strive for a better submarine. Congress reversed that decision and funded the Seawolf as well as providing $100 million to work on a more advanced attack sub.

The Navy wants $1.7 billion in the fiscal 1989 budget to buy the first Seawolf. Carlucci is reviewing that and other plans in his effort to restructure his budget to fit the new realities of a Congress determined to flatten the Defense Department's spending rather than increase it yearly as President Reagan had requested.

Congress last year approved a $3.3 billion nuclear-powered aircraft carrier, due in 1997, and a $3.6 billion carrier, for service in 1999.

"We can fix the surface Navy," Battista said in making his case against the two new carriers. "The real threat is undersea," he said, meaning that developing better submarines and combatting Soviet ones should receive top priority in the era of tighter budgets.

Service leaders contend the Navy is confronted with many carriers growing old simultaneously and must build new ones to have 15 capable of being deployed to distant locations. They also insist that the Seawolf will be the best attack submarine.

In other remarks made during a luncheon with a group of reporters, Battista discussed:

- **Procurement.** The elaborate rules that Congress and the Pentagon have imposed on defense contractors have cluttered the process to the point that the nation is now "spending $10 to save $1." A better approach would have been to make the punishment for shoddy work and outright fraud so severe that few contractors would have dared take the risk.
- **Air Force Maverick air-to-ground missile.** Not worth continuing to buy.
- **Research duplication.** The Pentagon has been so lax in winnowing out duplicative projects that the military services currently are developing six different radio programs "all to communicate with another airplane."
- **Navy shipbuilding.** The fragility of the USS Stark, severely damaged by a French Exocet missile in a Persian Gulf attack last year in which 37 sailors died, and problems with the new Arleigh Burke destroyer stem in part from "incompetence" in designing ships. "We're running out of naval architects."

Battista plans to leave his subcommittee staff post on Feb. 15. He will be succeeded by Carl T. Bayer, who another subcommittee staff aide, and a new staff member, Thomas Hahn, who formerly worked there before going into private business.

You may recall a rather heated debate before Mr. Bennett's Sea Power Subcommittee in 1987 when I made this charge. You supported the recommendation to allow the SSN–21 program to go forward in conjunction with the development of an NAS for which you provided $100 million additional authorization. The Navy objected to this add-on. In retrospect, the Congress never got what it requested.

The House bill puts the U.S. submarine program in proper perspective. Your bill makes the industrial base the benefactor of what we do for the fleet rather than the converse. I believe that our industrial base is in a rut. Through years of doing business the same old way, the submarine industry has not capitalized on advances in commercial technology. Consequently, we are paying too damn much for today's submarines. I don't place blame on the industry for this. The folks at EB and Newport News are hard working, honest and proud. They deliver only what the customer asks. Rather the blame is on the Navy, the Department of Defense and indeed, the Congress. The blame is on the Navy for putting its head in the sand and ignoring technological advance in favor of acquisition. Further, the Navy continuously discounted Soviet advances.

I blame the Department of Defense for not serving as an effective Board of Directors and allowing the Navy to proceed with a flawed program.

I blame the Congress for not exercising the proper oversight and providing authorization and appropriation for a program that would allow the Russians to forge ahead of us.

Until this year, you legislated mediocrity. To be perfectly blunt about it, there was more concern over the industrial base and the urge to "build something" than there was over the future of the fleet.

Let me give you a few points to consider on the cost of submarines:

(1) In World War II an aircraft carrier cost about $80 million, a submarine e.g. the Balao class about $2.3 million—a ratio of about 35 to 1.

(2) Today an aircraft carrier costs about $4.5 billion, a *Seawolf* submarine about $3 billion (I'm being conservative)—a ratio of about 1.5 to 1. Do you wonder why a nine thousand ton nuclear powered submarine should cost nearly as much as a *ninety-six* thousand ton nuclear powered aircraft carrier?

(3) The Germans, Swedes, British, Australians and others all build submarines in the 1800–3000 ton displacement range with diesel power at a cost of $200–400 million each. These costs follow projections from World War II. Despite our larger submarines with nuclear power, can you rationalize a 2.6 to 2.8 billion dollar differential?

(4) Nuclear propulsion results in about 70 waste heat. We dump this waste heat overboard and still provide discrete heaters on submarines. Perhaps the cost of heaters is not that high but has anyone wondered why we don't use some of this waste heat to eliminate the heaters?

(5) The Australians contracted a U.S. firm to build the combat control system for under $100 million including the "wet end" for its Collins class submarines. Although the Navy would argue, I contend that the *Seawolf* combat control system costs over $500 million. Another interesting point is that the cost overrun for the *Seawolf* combat control system was $900 million in a single year—or 900 percent more than the cost of the Australians' system.

A few months ago, I purchased a personal computer with a Pentium 90 mhz capability for $3,200. Within 60 days, the price dropped to $2,200 due to the announcement of the 125 mhz capability. While the price of commercial electronics drops, the price of submarine electronics keeps rising.

I could go on but, in my view, we are paying far too much for submarines, are not capitalizing on commercial advances and until the House bill, we have supported an industrial base that, as structured, is the very reason why we cannot afford to build the requisite number of submarines.

Mr. Chairman, I would like to address the issue of the SSN–23. Of course the fleet could use the SSN–23 if it were authorized and appropriated, but the main issue is whether the Navy or the country can afford it. Let's put to rest the correlation between the industrial base and the 23. Forging ahead with the SSN–23 does nothing for the submarine design industrial base—the SSN–23 is already designed. The second industrial base issue affects the blue collar work force. This problem could be solved by assigning some SSN–688 overhauls to EB. I cannot understand why we are cutting up nuclear powered submarines at less than half the remaining service life. *If you are going to reconsider your SSN–23 position, please do so on the basis of affordability and fleet requirements and not on the specious industrial base argument. There are other and less costly bridges between the SSN–22 and the NAS.*

The SSN–23, regardless of your position, does not represent a $1.5 billion investment, rather an investment of about $4.5 billion. I use an algorithm derived from history, i.e. the life cycle cost of a submarine equals the acquisition cost, therefore, you have $1.5 billion in remaining acquisition plus about $3 billion in operations and maintenance. Accordingly, Mr. Chairman, you will be authorizing $4.5 billion to support the SSN–23 or 2 of the entire submarine force.

The other aspect of your position relates to the New Attack Submarine—the NAS. The House bill is a radical departure from the "business as usual" approach to submarine design.

There is absolutely no need to rush to a 1998 submarine that will be slower than its predecessor, carry fewer weapons and has less operating depth. I would also conjecture that there is no way on earth you will get this submarine for $1.2 or even $1.5 billion each.

Please recall that the SSN–21 class was supposed to cost $1.3 billion each and I advised this committee, as a member of your staff in 1986, that the cost would exceed $2.5 billion—its in your transcripts.

Your bill calls for competitive designs of the NAS. This means we keep two yards in the design business. If the intent of your bill is carried out, there will be commercial practices and hardware in the next generation submarine. Perhaps for the first time we will stop paying tens of thousands of dollars for pumps that are commercially available for less than a thousand dollars. Perhaps we will get away from expensive signal processor "number crunchers" and turn to commercially available processors and computers that do much more and cost much less. The NAS that you are asking for can, in my opinion, be built at a unit cost around $1.2–$1.5 billion.

Mr. Chairman, members of the subcommittee, I am a strong proponent of our submarine forces. I believe that the Navy needs even more money than it requested this year. The low level of funding requested for the Off ice of Naval Research is borderline silly. There is no way that the U.S. could ensure technological superiority by spending a few tens of millions of dollars on basic research and exploratory development.

What is of equal, if not greater, importance than "how much" money we spend on submarine and anti-submarine warfare technology and systems is "how we spend" the money.

The House bill represents a good start on this latter issue. It's a first step in getting the Navy to change from an acquisition oriented submarine development approach to one that is performance oriented and concomitantly one that will allow us to surpass an outstanding Russian capability.

Mr. Chairman, you know better than I that the world order has changed. The strategic triad once consisted of bombers, submarines and intercontinental ballistic missiles. Today, however, I view one leg of our strategic triad being national defense, the second leg is our national economy and the third leg is our domestic problems—crime, drugs, etc. Our strength will be derived from the solution to these domestic problems, the solution to our economic problems—deficit reduction, etc. and selection of national defense programs that will ensure our superiority at the lowest practical cost. The new legs of our triad have even greater interdependence than the synergy among the three legs of the old triad.

The new submarine that the House bill wants this country to build will be with us beyond 2025. You have made this year the epoch for a completely new way of building submarines. I hope your position prevails. Twenty years from now, the fleet will be the beneficiary of the insurance policy that you wrote this year and it will be the Russians who will be trying to catch up.

Senator COHEN. Thank you very much, Mr. Battista. Dr. Wood.

STATEMENT OF LOWELL WOOD, PH.D., VISITING FELLOW, HOOVER INSTITUTION ON WAR, REVOLUTION AND PEACE, STANFORD UNIVERSITY

Dr. WOOD. Thank you very much, Mr. Chairman. I certainly appreciate the Subcommittee's invitation to appear and testify today on the technological aspects of undersea warfare in the context of the Congress' ongoing oversight of the Navy's tactical submarine program.

In spite of their relatively modest quantities, relative to those of potential adversaries, the Navy's attack submarine fleet dominated the oceans during the Cold War, crucially enabled by the fact that we could determine by stunningly long-range acoustic means rather precisely where Soviet submarines were operating—at least most of the time—while the Soviets could not locate our subs by any really effective means at all. Due to the synergistic effects of treason by key Americans, theft of advanced Japanese technology and, probably most importantly, overall technological advance, the Soviets managed to quiet their most advanced deployed submarines down to the level of our best ones, just as the Cold War ended. I think that Mr. Battista's emphasis on the fact that they really are there, not that they will maybe someday be there, but they are there already, is very important in this respect.

With the collapse of the Soviet Union, the United States quite abruptly discontinued our most advanced class of attack submarines, the *Seawolf* just as it was getting into production. Only 3, of course, will be built. The Russians, in contrast, seem to be building both attack and ballistic-missile launching submarines at rates not greatly lower than those during the Cold War. The reasons for this are not altogether clear, although Russian Defense Minister Grachev recently remarked to the effect that Russians and everyone else have learned, presumably from we Americans, just how important modern submarine capability is to any nation which aspires to great power status.

In essence, we Americans are presently trying to figure out where we are to go from here with respect to tactical submarines. Both the international security implications and the economic stakes, as Mr. Battista has just emphasized, are huge. For example, a single *Seawolf* costs almost $3 billion, and we planned to build several dozen of them. Their successors will not cost a great deal less, as Tony has just emphasized, and the Navy is presently seeking congressional authorization to build a few dozen of them.

The Navy, understandably concerned with maintaining its ability to create attack submarines at all, proposes to immediately proceed to build *Seawolf*-Lite, a class of attack submarines offering everything that *Seawolf* did, but in significantly more modest quantities. This used to be called the Centurion class, and when that proposal did not fly, of course, it was labelled the New Attack Submarine, which is its current designation.

In sharp contrast, the Russians are currently completing the first of their new class of tactical submarines, the *Severodvinsk* class, which is expected to be comparable to or better than the *Seawolf* in all military respects, with the notable exception of nuclear propulsion safety and reliability. It is these best-ever Russian boats that the New Attack Submarines will face during the coming third-half century, and they will face them from a standpoint of tactical inferiority in most all militarily relevant respects.

The Soviet Navy's commitment to submarines was impressive in all respects. The corresponding commitment of the present-day Russian Navy, some of whose sailors are literally starving, is awesome.

The neoclassical technology pervasively expressed in the design for the New Attack Submarine would be less sobering if it did not occur against the background of steady Russian advance in essentially all areas of submarine technology, from acoustic quieting, in which they have by now entirely eliminated the longstanding

American advantage, to advanced weaponry in which they have very recently moved well ahead of us.

In contrast, American submarine technological advance over the same dozen-year interval just ending has been remarkably modest, not due to lack of opportunity, but rather deficiency of effort, arising, I believe, from the perceived risks associated with any technological advance. The resulting long-term technological trend is undeniably and fundamentally adverse to our Nation's security. Aesop's parable of the tortoise and the hare inescapably comes to mind: Already drawn even with us, the Russians are doing the very best of which they are capable while we Americans do far less.

In this respect, Mr. Chairman, I would like to invite your attention to an extract from the prepared statement which my senior colleague, Dr. John S. Foster, Jr., offered before the Procurement Subcommittee of the House National Security Committee last September. Dr. Foster, of course, could not be here today, but he gave me permission to distribute copies of his statement, and there is a brief excerpt that I think is very relevant here.

[The prepared statement of Dr. Foster follows:]

PREPARED STATEMENT BY JOHN S. FOSTER, JR.

Dear Mr. Chairman, the following is offered as testimony in response to your request that I appear before your subcommittee on the application of advanced technology to a new attack submarine.

At the outset, Mr. Chairman, I wish to express my thanks to you for providing transcripts of the Committee's 1989 hearing on Anti-Submarine Warfare as well as more recent information, which was very helpful to me in preparing this statement.

I propose to briefly address four topics: first, indicators for the 21st Century; second, the question of missions for attack submarines; third, my impressions of the planned U.S. submarine program, and finally some recommendations.

THE 21ST CENTURY

When we try to think about the 21st Century we should realize that the missions for which we will need to use submarines will probably be different and have to be accomplished under conditions which are very different from the present. While we cannot know just what the 21st Century will be like, there are three revolutions now going on that are likely to be determinants to that future situation.

The first revolution is technological and has to do with the rate at which large nations, particularly Russia, China and India are improving their submarine capabilities. You will recall that during the last decade the Russians made very rapid improvements in the qualitative characteristics of their submarines, so that today the performance characteristics of their best boat is roughly the same as our best boat. However, a key concern is that their rate of improvement has been substantially greater than ours and if we don't change our ways, they will attain qualitative superiority. In addition, the rate at which they are producing new classes of submarines is higher than ours so that could place them in the 21st Century with a larger number of submarines with qualitative superiority.

The second revolution is the proliferation of submarines and associated weapon systems that are being supplied by Russia, Sweden, Germany, France and Great Britain to smaller nations around the world. Perhaps the most worrisome type is the air-independent propulsion diesel/electric submarines. These boats can be the most quiet submarines, with modem weapon systems and higher speed torpedoes. When operation in their littoral waters and queued by external regional sensors, they can place our large boats at a disadvantage.

The third revolution is driven by economics. As a consequence of budget reductions, we are downsizing our military forces. The concern is that, in the process of downsizing, we may not chose to make the investments necessary to provide adequately and appropriately for a superior military capability in the 21st Century.

MISSIONS

Given these ongoing revolutions it seems likely that for the 21st Century the types of missions for submarines and their priority will be different. For example, we may not place highest priority on producing submarines which can outperform any adversary in a mid-ocean dog fight. Rather, we are likely to place highest priority on the use of submarines in critical roles associated with joint military operations in regional waters.

We call on submarines to perform different missions and it is important to be clear on what mission is to be accomplished before developing advanced technology and applying it to a new submarine. The following identifies five missions and a salient characteristic for each.

- A surveillance and reconnaissance mission, for which the submarine may have to carry specially configured payloads.
- A land attack mission. For this mission, the submarine should have the ability to carry large numbers of ballistic and/or cruise missiles having ranges of up to, say, 1,500 miles.
- Covert missions, which may require that the submarine have a large volume to permit the transport of a significant number of special operating forces.
- An anti-submarine mission, which requires that the submarine be able to detect and identify a submarine as hostile and destroy it before being attacked, while operating in deep or shallow (littoral) waters. This requires not only superior sensors, a rapid information processing and decision capability, but also a high speed torpedo.
- An anti-ship mission which may require the use of cruise missiles to permit the submarine to be a greater distance from hostile ASW systems.

From the above descriptions, it should be obvious that one configuration of an SSN will not be optimum for all missions, and so flexibility to reconfigure is important. But, for any mission a submarine must be stealthy. Not only must it be very quiet, it must also have a minimum electromagnetic signature, cause disturbances that are not easily detected by any known sensors, and any structure that may appear above the water's surface must be difficult to detect by known sensors. It must also be able to rapidly detect and categorize the presence of objects above and below the water's surface.

IMPRESSIONS

I have five impressions of current US Navy objectives, strategies, plans and programs which cause me to be quite concerned.

- First, while we have had good intelligence over the years on the nature of the threat and have conducted research, development and test activities to address that threat, it seems to me that the application of those developments to new classes of submarines has taken entirely too long, particularly in the last half dozen years. Why is this so?
    - — The declining budget is certainly one reason. The Anti-submarine Warfare RDT&E Program budgeted in the mid 80's at about $1.5B has declined and is now projected to decline further to about $500M by end of the FYDP. Unfortunately the ASW Master Plan appears to have fallen into disuse, which might suggest that the ASW research and development is not high on the Navy's priority list.
    - — A second reason is the DOD acquisition process. As the Committee is well aware, Secretary Perry has launched a major effort to improve the acquisition process. However, even though the task has high priority, progress is very slow.
- Because of our management approach and the resulting structural design of our submarines, major upgrades have required extensive changes which take a very long time and are very expensive. A recent example is the new SSN. In an effort to reduce cost, the new SSN has been reduced in size. The consequence is a reduction in flexibility. I'm not persuaded that the resulting reduction in flexibility was the best way for the Navy to save money. I believe it will grow to accommodate priority missions of the 21st Century and cost us even more money for upgrades in the out years.
- Our approach to operations aboard submarines requires that activities be conducted manpower intensive rather than automated. This approach will continue to demand large crews, large submarines and high costs.
- Further, the nature of the information and command control system requires the passage of too much time from the detection of a target, its classification, the decision to launch the appropriate weapon and the time for the weapon to reach its target. During this period we are especially vulnerable to attack.
- Finally, the new world environment and new tactical environment are likely to require new weapons for attack and for self defense. An increase in the tac-

tical missile shooting rate of the submarine would be of great value in the 21st Century conflict, but we see little effort to provide such a capability in a next generation submarine for this mission.

CONCLUSIONS

From the above impressions, I come two conclusions: The first is that the Navy, faced with major budget reductions, has had to address a difficult strategic issue with regard to SSN's: whether to continue with the production of a new class of submarine or, to initiate aggressive development and application of new technologies to overcome the challenges of the 21st Century. My sense is that the Navy chose the first alternative but couldn't see their way clear to provide funds for both.

My second conclusion is that the Navys' approach may not prepare us adequately for the 21st Century. The ongoing revolutions as well as our budget limitations will demand large changes in how our submarine force is configured. I am not sure we well understand the missions which will need the submarine. I also know we have not fully digested the implications of new technology nor new ASW phenomenon on the optimum design of our force.

However, a superior threat is more a potential threat not one in being; Russia's recovery and stable government are still distant; other nations which might be enemies are just beginning to digest the new military technologies. We have time to prepare our technology and pursue several prototype submarines types. At a reasonable budget level I believe there is a more appropriate way for the undersea Navy to move into the 21st Century.

RECOMMENDATIONS

In light of the above, I suggest that the Navy consider seriously the implementation of a paradigm shift in the way we pursue the development of advanced new submarines. The new way of doing business might employ the following eight recommendations.

- First, we have a new world out there and it calls on submarines to perform different missions and with different priorities. I suggest that the Navy be requested to describe the various submarine missions and include a description of the characteristics which a submarine must possess in order to best accomplish the mission with minimal losses.
- The Navy should generate an aggressive ASW Master Plan.
- Arrange for ARPA to be a major partner with the Navy to contribute to the new thinking on SSN's and be an associate in all phases of the program. ARPA could be particularly helpful if it took the lead at the early, more speculative and pioneering stages. If the results were promising, the Navy would take the lead through to fleet operations.
- Some Navy submarine missions can be accomplished just as well with a smaller, advanced non-nuclear submarine like the Australian "Collins" submarine. Of course, there are missions it cannot do as well as a nuclear submarine. But, since it costs about one-third as much, consider a mix as the best way to reduce costs.
- Consideration should be given to the use of rapid prototyping for two or three generations over the next decade before settling on a new class of SSN.
- In order to be able to perform the rapid prototyping of the different functions, and for different missions, consider a submarine which is modular in design and designed specifically to accommodate upgrades. The purpose of this approach is to permit the rapid introduction of new generations in functional and mission capability. For example, the reactor section and perhaps the machinery section might be one module, the weapons bay another, a surveillance module, a SOF module, and so on. This modular concept may also provide a convenient way to more quickly and cheaply convert a submarine from one mission to another mission, including timely upgrades.
- Consider a paradigm shift in design philosophy. For decades we have used a mechanical engineering, cut and try approach, admittedly with considerable success. Consider launching an electrical engineering design philosophy. The new 3D engineering tools, electric propulsion, active noise cancellation, automate functions aboard the submarine now performed manually, etc.—all these offer the possibility of higher performance at less cost.
- To avoid many of the difficulties associated with the DOD acquisition process, consider using the Advanced Concept Technology Development (ACTD) process in conducting the rapid prototyping.

In summary, I would hope that these eight initiatives might permit us to much more rapidly achieve qualitative superiority in each mission particularly in the conduct of joint military operations.

Mr. Chairman, I thank you for this opportunity to share my views with this Committee. I urge the Committee to request that the Navy and ARPA present plans to achieve superiority across the full range of near future submarine missions without specifying how they should do it. With your guidance and support I am confident we can meet the challenge of the 21st Century submarine warfare.

Dr. WOOD. Dr. Foster, of course, served as the Defense Department's senior acquisition executive in the 1965 to 1973 period, served as Chairman of the Defense Science Board during Defense Secretary Cheney's tenure a few years ago, and he has been one of the most senior members of the national security technology community for the last half century, and certainly very recently. His prepared statement speaks to this very issue, and reads as follows:

"While we cannot know just what the 21st Century will be like, there are three revolutions now going on that are likely to be determinants to that future situation. The first revolution is technological and it has to do with the rate at which large nations, particularly Russia, China and India, are improving their submarine capabilities.

You will recall that during the last decade, the Russians made very rapid improvements in the qualitative characteristics of their submarines, so that today the performance characteristics of their best boat is roughly the same as our best boat. However, a key concern is that their rate of improvement has been substantially greater than ours, and if we do not change our ways, they will attain qualitative superiority.

In addition, the rate at which they are producing new classes of submarines is higher than ours, so that it could place them, in the 21st Century, with a larger number of submarines with qualitative superiority."

That is the end of the excerpt from Dr. Foster's remarks.

The high likelihood that American tactical submarines will be called upon for a variety of missions for which the New Attack Submarine is not truly well-suited foretells a series of expensive retrofits, driven by serious gaps in a future American military capability undersea. The New Attack Submarine, as its name implies, is seemingly quite mission-focused on mid-ocean dogfights. It may well be inferior in combat to modern, already widely proliferated diesel/electric boats in engagements in coastal waters, especially when such subs are fighting on their home grounds.

It is not manifestly well-suited to performance of important submarine-centered missions already emerging in the post-Cold War geopolitical environment, such as standoff, anti-ship attack, covert operations support, land attack, and surveillance and reconnaissance. It is a Cold War relic, pared down in costs and capability, to give the appearance of fitting into post-Cold War budgetary envelopes.

The Navy's plan to scrap many improved Los Angeles-class attack submarines well short of their rated operational lifetimes in order to make room in the rapidly shrinking undersea fleet for the New Attack Submarines is an example of large-scale waste in the pursuit of likely military inferiority. Many if not all of these still young Los Angeles boats, reworked in both of the Navy's nuclear shipyards during the next decade, could serve the Nation well as test beds for new submarine technologies and as operational prototypes for the expanded set of submarine mission areas even now emerging.

Doing so is merely one way in which the Nation's nuclear submarine industrial base could be maintained in excellent health without the Nation plunging headlong into a large-block buy of New Attack Submarines at the present time.

Senator COHEN. Dr. Wood, is this a deliberate act by the Navy, taking us into a period of calculated inferiority? The way you describe it, it sounds to me as if the Navy, being completely aware of the threat that is out there, nonetheless is dedicated to achieving an inferior status vis-a-vis the Russians.

Dr. WOOD. I do not believe that it is all deliberate, sir. I would not impute such motivations to any Navy officer. I believe that the Navy, as my colleague Mr. Battista has indicated and as Dr. Foster's statement indicated, has been relatively heedless of what the Russians have been doing, are doing at the present time, and are likely to do in the future.

Senator COHEN. "Heedless," to me, is a word—we were talking about words here today—"heedless" is a very strong word, saying that the Navy, in the face of clear and convincing evidence, is pursuing a path that will lead us to inferiority. So we are not legislating mediocrity, we are pursuing it.

Dr. WOOD. It is a commonly owned problem, sir.

Senator COHEN. Excuse me, would you please repeat that?

Dr. WOOD. A commonly owned problem. It is not exclusive to the Navy or to the Defense Department. The Congress advises, consents and mandates every year to these things. Legislating mediocrity is one way to phrase it. Moving in a somewhat rudderless fashion into a future in ways—not just in my opinion, but in Dr. Foster's opinion—likely to lead to both quantitative and qualitative inferiority is, I believe, an objective characterization of the current state of affairs.

Mr. BATTISTA. Senator, can I add something very briefly?

I spent 11 years of my professional career in a Navy laboratory. We often had direction not to give test results to Congress on weapon systems that clearly would have put their capability in question.

Senator COHEN. I guess what I am trying to get at is what do you think is the basis for this? Are there people within the Navy and people here on the Hill that you believe are dedicated to achieving a level of inferiority or mediocrity? Is this an intentional thing? Is it bureaucratic?

Mr. BATTISTA. No, I agree with Lowell. It is not intentional. It is IOC driven. For God's sake, we have got this platform authorized by the Congress; let us not do anything to upset it; we will fix it later on.

Senator COHEN. I do not want to take too much time away from Dr. Wood. I will let him complete his statement.

Dr. WOOD. I would just complete very briefly, Mr. Chairman, if I may.

In summary, the Navy's currently proposed New Attack Submarine expresses considerably less than the best the American technological community can presently offer and which American shipyards can currently build. The underlying procurement program bids to ensure American military inferiority in the undersea environment well before it is completed 4 to 5 decades hence. These fundamental deficiencies were apparently recognized by the Congress, which declined to authorize more than two of the requested New Attack Submarines in the fiscal year 1996 Defense Authorization Act recently completed.

For all of these reasons, I am here today to speak vigorously in favor of sustaining American military supremacy in the absolutely vital undersea environment, albeit along the lines rather different than those currently proposed by the Navy. America's brave men who go down to and under the sea in ships during the next half century deserve considerably better than the Navy's attack submarine bureaucracy currently has on offer. I respectfully suggest that it is for the Congress to insist—clearly, resolutely and effectively—that they get it.

I thank you very much, Mr. Chairman.

[The prepared statement of Dr. Wood follows:]

PREPARED STATEMENT BY DR. LOWELL WOOD[1]

TECHNOLOGICAL ASPECTS OF UNDERSEA WARFARE

"I am not certain that there is always progress. There may merely be change."
—William James

I certainly appreciate the committee's invitation to offer testimony on technological aspects of the Navy's submarine program, in the context of the Nation's undersea military capabilities during the next few decades.

BACKGROUND. I have been an interested observer of both American and foreign undersea warfare capabilities for over a quarter-century, having started serious work in this area on a non-acoustic antisubmarine warfare study under Harold Smith's leadership 26 years ago. Indeed, Harold and I were privileged to serve the House Armed Services Committee under Les Aspin's leadership in 1988–1989 as members of the Advisory Panel on Submarine and Antisubmarine Warfare, in the company of such distinguished colleagues as Bill Perry and Paul Kaminski, Johnny Foster, George Heilmeier, Harry Jackson and Harold Rosenbaum, and retired admirals Ed Burkhalter and Bob Wertheim. It is in such respects, continued in the course of more recent advisory service to the House National Security Committee under the leadership of Floyd Spence and Duncan Hunter, that I appear before you today.

SOME HISTORICAL PERSPECTIVE. A half-century has passed since the last instance of large-scale undersea combat, an interval during which submarine technology has advanced more than in all of the brief preceding history of this rather novel arena of warfare. It is important to recall that warfare in the submarine medium isn't much older than that conducted in the Earth's atmosphere, and that exploitation of each medium has conferred enormous military capabilities, both tactical and strategic, on those nations which have mounted the necessary efforts.

The United States expended several billions of present-day dollars each year to maintain its attack submarine forces, and comparable sums on creating ballistic missile-launching submarines, in the time-average, throughout the half-century-long Cold War; submarine force operating expenses and weaponry costs were additional. These expenditures were comparable to those made by the Congress for procurement of fighter and bomber aircraft, respectively, during the Cold War.

Interestingly, the Government of the Soviet Union, though working with a several-fold smaller national economy and burdened with a substantially inferior technology base, chose to essentially match the United States in quantitative terms, in both tactical and strategic submarine force levels, during most of the Cold War. Significantly, the Russian government's defense minister, a paratrooper by professional background, recently declared his nation's intention to maintain a world-class submarine force, no matter what the cost might be in other aspects of military power. (I'll speak more to qualitative comparisons between the two nations' undersea forces subsequently.)

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[1] Visiting Fellow, Hoover Institution on War, Revolution and Peace, Stanford University, Stanford CA 94305–6010. Opinions expressed herein are those of the author only.

A basic point is that telling levels of military force appear to be comparably expensive in the oceanic and atmospheric media, at least when expressed in contemporary technologies. Submarine fleets and fighter-and-bomber wings of superpower force-levels each cost $50–100 billion to create and several billions annually to operate. Each therefore seems comparably worthy of serious, sustained policy-level attention, for both economic and military reasons.

SOME FUNDAMENTAL TECHNICO-MILITARY DIFFERENCES. There are several fundamental asymmetries, either purely technological or military and technological in origin, between the military forces which operate in the two great fluid media of the Earth, the ocean and the air. Military aircraft characteristically fly in the vicinity of the speed-of-sound in air and fire weaponry whose speeds are at most a few times that of sound, while submarines through the present time typically travel through the ocean at 1 percent of water's sound speed and fire armaments whose speeds are at most 3 percent of sound speed. Correspondingly, submarines typically have mission durations of weeks to months, while military aircraft mission times are denominated in a few to a few dozen hours, so that both types of platforms offer "global reach" during a single mission's duration. Quite crucially, submarines generate "lift" through passive buoyancy, while virtually all military aircraft do so through the effects of powered flight acting on airfoils, so that the energetics of aircraft and submarine travel are profoundly different. Accentuating this asymmetry is the successful appeal made by submarines to the use of nuclear energy for their motive power, which confers indefinitely great mission duration capability on undersea vessels sufficiently large to carry one or another types of nuclear power reactors.

Submarines, however, "see" other submarines only at the speed-of-sound in water, i.e., acoustically, while aircraft usually detect each other—and sense other aspects of their operating environment—at the speed-of-light, which is more than a hundred thousand times greater. In addition, the atmospheric medium is highly transparent across much of the electromagnetic spectrum, while the ocean is quite opaque at nearly all electromagnetic frequencies. As a result, submarine operators have come to rely nearly completely on low observability—stealthiness—rather than on analogs of either the passive or active defensive means characteristic of modern aircraft. Their platforms are slow and potentially highly vulnerable to lethal attack, but their effective invisibility—while underwater has proven not only remarkably enduring but quite sufficient to maintain their extraordinary military effectiveness.

Unfortunately, perhaps, none of these technological asymmetries are truly fundamental in their origins. They do not follow at all directly from the laws of nature, but rather arise from engineering conventions and follow from historical accidents. There is no basic physical reason why torpedoes of appropriate design cannot travel through the water at far higher speeds than those which are presently carried on American submarines, or—for that matter—why submarines themselves cannot travel submerged at speeds even dozens of times greater than they presently do, in the same speed regime as modern fighter aircraft. Similarly, there is no truly fundamental reason why a submarine cannot "see" nearly as clearly through the oceanic medium as a fighter aircraft can through the normal air while an adversary submarine remains nearly blind—i.e., the underwater analog of stealthy aircraft engaging non-stealthy ones, or of radar-equipped fighter aircraft engaging ones not so equipped, at night or in bad weather.

Obviously, substantial advances along any of these axes will significantly change the character of undersea warfare, while full attainment of any of the capabilities presently in view will revolutionize it. Such technological prospects necessarily frame the present discussion as to how the Congress should most aptly mandate the Navy to create the Nation's undersea force for the first half of the 21st Century.

Emphasis is given to these considerations by *the two facts that the best Russian submarines are now comparable to our best ones in their quantifiable performance features and that the Russian rate-of-advance over the past dozen years or so has been considerably greater than ours.* The basic prospect in the surprise-free scenario is for *Russian subs to gain performance superiority over ours within the next decade or so—and thereafter to have more of these superior boats than we will have of our inferior ones.*

ASPECTS OF THE CURRENT INTERNATIONAL STATE-OF-PLAY. It is a happy accident of history that Russians and Americans have never been engaged in large-scale combat, so that relations between our peoples are not embittered by memories of associated losses. Undersea combat, necessarily involving hundreds of lives lost when a single contemporary submarine is sunk, presents a not-completely-unlikely prospect for such combat and losses, which might occur inadvertently and in a matter of a few dozen seconds, without any participation by senior officials of either government. It is therefore of especial concern that the American undersea Navy not tempt its Russian counterpart to adventurous behavior by further deterioration of our position in the areas of relative weakness which already are manifest.

To be sure, the Russian undersea Navy and its officer corps have developed restraints on both strategic and tactical behaviors appropriate to a superpower confronting another superpower, bounds which are unlikely to be reliably found in less geopolitically mature navies which may confront American undersea forces within the next few decades. Our loss of a submarine-and-crew in Third World littoral operations, perhaps ones not involving declared hostilities—which complete loss is regrettably not at all unlikely during the coming quarter-century—may precipitate a less-than-well-considered response on our part which might be prejudicial to our national interests for a considerable time thereafter. We may expect such a loss to involve regional sensors which cue adversary operations against our sub, and perhaps to be executed by a very quiet adversary sub having diesel-electric propulsion and carrying modern torpedoes (all of which move actively in international arms commerce today). Such an attack may involve little or no warning, and furthermore may not be unequivocally attributable to a particular foreign government.

History teaches that the shock of the loss of an entire crew, a premium vessel and attendant national prestige—be it the *Maine*, the *Lusitania or the Arizona*—can impel the American people and their political leaders to respond swiftly and at least as sharply as cool calculation of enduring interests would indicate. It therefore seems quite important that *all* foreign opportunities for such provocations be curtailed severely, and thus that we should not send our submarines and their crews into harm's way at all gratuitously.

However, in order that our submarines confer benefits on the Nation commensurate with their great costs, they must be highly useful in many geopolitical circumstances. Unquestionable robustness against both known and likely emergent threats to them thus is a *sine qua non*. Such robustness is currently lacking, and this deficiency will become ever sharper in future time, unless major corrective actions are taken.

MAJOR ISSUES FACING THE UNDERSEA NAVY. Obvious though such considerations might seem, they do not appear to be fully reflected in Navy thinking and planning regarding a new generation of tactical submarines. Self-confidence bordering on complacency in the face of known foreign exploitation of well-documented American platform vulnerabilities is but one example of an overall attitude which could end in disaster. While such casual behavior might be reasonably grounded in Soviet—and now Russian—circumspection short of the outbreak of large-scale hostilities between the superpowers, it seems imprudent to the point of rashness when potentially confronting Third World "non-deterrables" newly equipped with purchased foreign technology, e.g., of Russian, Chinese or western European origin. (Russian or Chinese motivations to thereby rather blamelessly obtain field evaluation of weaponry effectiveness against American submarine forces appear obvious, particularly after Operation Desert Storm.)

Present-day Navy focus on a single class of tactical submarines—really, anti-sub attack submarines—in the face of widely recognized national military needs for a very wide—perhaps unprecedentedly wide—variety of submarine-centered services and capabilities is another example of incomplete convergence between current Navy planning and long-term national interests. During the Cold War, *anti-submarine* missions (involving adversary sub detection-and localization, excellent fire-control and torpedo launching) were the nearly exclusive focus of American tactical submarine forces. In the post-Cold War world, other rather different submarine-centered mission types including *surveillance and reconnaissance* (involving special non-weapons payloads), *land attack* (involving—specialized long-range weaponry load-out and launch capabilities), *covert* (likely involving transport, launch and recovery of substantial special operations forces) and *anti-ship* (likely involving load-out and launching of long-range stand-off weaponry to improve ASW-related survivability), may well become of comparable or greater importance.

Support of these other sub-centered mission areas does not appear to be a major consideration in present Navy submarine force design and procurement, however. To its great credit, the Navy performed rapid, reasonable economical and generally high product-quality prototyping of two dozen different types of submarines in the 1950s and 1960s. Therefore, it seems likely that it is (relative) disinterest in a highly versatile undersea force, rather than incapability, which underlies the contemporary Navy's rather exclusive focus on mass production of a single class of attack submarines for which the contemporary national need is not entirely clear.

Indeed, the remarkable *lack* of *military* need for new attack submarines at the present time is clear from even cursory inspection of documented national needs for undersea forces, viewed against the "population demographics" of our current attack submarine force. The United States presently owns nearly two boat-centuries of attack submarine capability in excess of its established needs, in the form of the more modern ("improved") portion of the *Los Angeles* class fleet. Planning to simply scrap this existing capability—whose present-time replacement cost is of the order of $20 billion—while commencing to buy successor boats which are less militarily capable in pertinent respects, moreover in an era of overall severely constrained national security resources, seems rather anomalous institutional behavior.

Most serious of all, however, is the undeniable fact that—due to engineering traditions and historical accidents to which I alluded earlier—the Navy has emphasized nuclear propulsion and acoustics technologies to the virtual exclusion of others of undeniable military importance, such as the boat's operational depth-rating and speed, the numbers, launch-rates, speed and range of its torpedoes, and perhaps even its combat survivability. Especially distressing in this light is our *de facto* loss of acoustic signature superiority and establishment of a trend toward acoustic inferiority during the last decade, the more so as this rather profound loss has been seen—and decried—from afar, e.g., by the HASC Advisory Panel on which I served in 1988–1989. The increasingly unacceptable state of affairs in that era has continued to deteriorate, and is now becoming a parlous one.

The Russians' improved *Akula* class already is every bit as quiet as the improved *Los Angeles,* and the *Severodvinsk* class of Russian attack submarines, soon to go to sea in first copy, likely will be at least as quiet—and perhaps quieter—than the *Seawolf,* America's best-ever. Strictly minimized acoustic signature is, of course, directly correlated with submarine stealthiness and thus both with survivability and mission effectiveness. Balanced minimization of other boat signatures is naturally required, but hasn't occurred to an adequate degree on U.S. boats.

That Russian attack boats, such as the improved *Akula,* are already at least comparable—if not markedly superior—to American ones of comparable age in virtually all military respects except nuclear propulsion features, is simply bizarre—the more so as the Russian Navy is profoundly poverty-stricken, while ours is maintained more generously than any other in the world, by far. Time-lagged effects can explain only a part of these fundamental incongruities.

I respectfully suggest that searching Congressional oversight with respect to these issues is now manifestly in order. If Bill Perry were speaking to you today from a comparable vantage-point as he spoke to the HASC in 1989, I expect that the substance of his remarks would not differ greatly from mine.

Compounding the difficulties we presently face is persistent Soviet—now Russian—commitment to technology-based innovation in undersea warfare, particularly along lines' which effectively counter America's general economic and technological superiority. A presently outstanding example is very high speed sub armaments, such as rocket-propelled torpedoes which, exploiting relatively novel engineering-physics principles, streak toward their targets at speeds a half-dozen times faster than the top speed of our submarines. In the memorable words of the chief designer of the Russian military center which has already created multiple generations of these formidable weapons, their action in combat "is like the lightning stab of a dagger." It was thoroughly distressing to hear some American military experts declare that such weaponry "violated the laws of physics" less than a year ago, and it is only slightly less troubling that we have nothing remotely comparable to it, nor effective defenses against it.

It is entirely possible that the Russians—or even, for that matter, the Chinese, exploiting Russian technical aid purchased with some of the $30 billion net of American foreign exchange which they gain annually via trade—will end-run and negate essential portions of our undersea military capabilities during the coming quarter-century, if present trends continue with respect to Russian in-the-field technological innovation undersea and our relative lack of it. We must also acknowledge that indigenous efforts by regional superpowers supported by foreign suppliers of key technologies will also be able to mount credible threats to our presently foreseeable undersea force projection capabilities in a number of not-unlikely circumstances. The ability of the United States to maintain a credible naval "forward presence" in much of the littoral areas of the world-ocean may rather abruptly collapse under the pressure of such local undersea force-structures.

CONTEMPORARY CHALLENGES FACING THE NAVY. The challenges currently facing the undersea Navy are dominated by the end of the Cold War and the uniqueness of the nuclear submarine industrial base. (While these challenges have a large technological component, military technology is advanced by individual humans and deployed by bureaucratic organizations, in political contexts. It would be foolish to ignore entirely human factors in discussing military technological challenges, and I won't do so.)

Today's Navy—personnel, doctrine, facilities and equipments—was evolved to confront the Soviet Navy in peacetime and to defeat it in war. The abrupt virtual disappearance of the Soviet adversary in most respects has been as disorienting to the undersea Navy as it has been to other "forward" components of the Nation's military structure. Quite understandably, the basic institutional reaction appears to be one of denial, with continuation of late Cold War planning and procurement practices. Earnestly advocating large block buys of remarkably expensive undersea platforms of a single type is only a single salient example. Devoting relatively little attention to likely future military requirements for tactical submarine-centered capabilities *not* involving the security of missile-launching submarine forces or "Soviet bastion-busting" is another.

The nuclear-powered submarine was a remarkably potent military instrument for both tactical and strategic undertakings during the Cold War, and the Navy's deep attachment to it had—and still has—eminently rational bases. However, exclusive loyalty to nuclear propulsion for submarines probably is indefensible in the post-Cold War world. Very high quality non-nuclear subs, such as the Australian *Collins* class, are *known to cost* about a third of what a new American SSN is *proposed* to cost, and are likely to be comparably mission-capable in many circumstances. (Navy failure to move toward a mixed submarine fleet might therefore raise questions as to the professional objectivity of its senior officers.)

Since such nuclear-propelled platforms have no civilian analogs, the ability to create them in any and all future times must be supported solely by the Navy. Perhaps understandably fearful of dealing with a monopoly supplier of nuclear submarines, the National leadership has recently mandated the Navy to competitively procure future tactical nuclear-powered submarines—*and* to do so with much greater economic efficiency. It is fair to guess that the Navy currently doesn't understand at all clearly how to accomplish both tasks simultaneously—or even how to procure boats superior to Russian ones in all militarily pertinent respects at *any* price that the Congress appears willing to pay. (The current *de facto* approach—sending money to all suppliers to produce a large block of diminished *Seawolf* boats with a new name—is as minimally burdened with imagination as it is with economic or military appeal. There are many, much better ways to sustain the industrial base for building nuclear-propelled submarines.)

It should be of very considerable concern to the Congress that *broadening submarine force capabilities, responding effectively to foreign technological innovation* in submarine warfare, and *introducing new technologies crucial to future military effectiveness* into the undersea military environment currently don't appear to be "on the radar screen," as the Navy submarine bureaucracy focuses rather exclusively on cutting the estimated cost of its proposed new attack submarines. It is likely that retrofitting responses to these emerging requirements into the new, "one size fits all" submarines will drive their actual costs back up to *Seawolf* levels, or even higher: more will *eventually* be paid, for less.

SOME RECOMMENDATIONS FOR CONGRESSIONAL CONSIDERATION. The Congress may wish to encourage the Navy to transition from a world view centered on a deep-ocean "Battle of Earth" against the Soviet Navy to an entirely different one which simultaneously hedges the Nation's options against a resurgent Russia and adapts to the quite different maritime military requirements of the "Cold Peace" world—within realistic resource envelopes. If such Congressional encouragement is not forthcoming, the institutional Navy seems unlikely to adapt in a really timely manner its planning and procurement—and, most importantly, its thinking and doctrine—to the challenges posed to it by the now abruptly changed geopolitical and military realities. Following are some suggestions as to where and how such congressional stimulation might most aptly be conveyed.

Mandated Organizational Modernizations. Congressional guidance might aptly include appropriate institutional modifications and re-chartering actions, so that the Navy's basic bureaucratic structures may better reflect the new and emerging challenges. This would likely have the nature of a one-time "fix," a mini-version of what the Goldwater-Nichols Act did for all of DOD a decade ago.

Among the substantial changes likely to be salutary are establishing a single, senior point within the Navy responsible for all submarine *and* anti-submarine technology R&D, setting all submarine-pertinent technologies—including nuclear propulsion—on a common-and-equal footing within the Navy, establishment of permanent "Red Team" arrangements with respect to all submarine design activities, providing for operational submarine commanders to have direct and regular input into all major aspects of the submarine procurement process, and strongly incentivizing a systems design approach to submarine creation, emphasizing modularity, multi-mission flexibility, no-preconditions trade-offs and reasonably frequent insertion of high-leverage technology. (A no-preconditions trade-oriented viewpoint at sufficiently senior levels will serve to reliably eliminate basic incongruities such as planning to scrap improved *Los Angeles* boats with many years of service life remaining in favor of mass production of at least arguably less capable successor-boats.)

Mandated Across-The-Board Competition. The Congress very properly mandated procurement competition for the new tactical submarines, in the Fiscal Year 1996 Defense Authorization Act. It would serve the National interest even more fully if competition were mandated in all aspects of the new submarine program, particularly in RDT&E, as well as in all aspects of anti-submarine warfare. If competition improves efficiency, performance and value-delivery to the Nation on the part of industry—and I strongly believe that it does—then it's seemingly hard to argue that competition wouldn't similarly benefit the Government-centered processes of realizing the submarine technologies for industry to embed in the boats which it produces.

Properly arranging for meaningful competition in submarine technology generation might be somewhat more challenging than commanding sub production by multiple shipyards—but it's likely to be even more important. Declaring across-the-board competition in all aspects of undersea warfare to be National policy and directing the Secretaries of Defense and the Navy to propose specifics would be an excellent first step for the Congress to take.

Rechartering *on an enduring basis* ARPA's technology program in undersea warfare at the $100–200 million per year level would be a decisive specific advance in securing for America's undersea force structure the best that the American technological community can offer. While ARPA's *modus operandi* can be fairly criticized from several perspectives, it is largely free of the Navy's profound institutional commitment to "steel structures that float" and is thus much more likely to search effectively for *all* of the best technology-based means for maintaining and enhancing American military dominance of the maritime environment. The Navy's senior officers—and their congressional overseers—may then select National options from a wider spectrum of technological offerings.

Mandated Balance Between Submarine and Anti-Submarine Efforts. The Navy is in the late stages of abandoning a vigorous anti-submarine warfare (ASW) effort: its ASW RDT&E budget has decreased from $1.5 billion annually in the mid-1980s to $0.5 billion at the end of the current FYDP—and this three-fold drop is in then-year dollars! Moreover, it has apparently scrapped the ASW Master Plan, so that residual ASW spending is relatively rudderless, and thus of even lower efficacy.

All this has occurred against the background of rapidly rising foreign submarine capabilities, and without formal review findings of the qualitative superiority of submarine-over ASW-centered means of negating such capabilities. The Congress might aptly direct the Navy to re-institute maintenance and use of the ASW Master Plan. In addition, it might request in-depth reviews and reports to the Congress—by both Navy and other national security components—of the efficacy of all potentially available means, including submarine- and ASW-centered ones, for negating foreign submarine threats, both present and emerging.

Assured Managerial Accountability and Stability. It's also important to enhance both personal and organizational responsibility and accountability across the entire spectrum of submarine RDT&E and procurement. One of the genuinely historic strengths of the nuclear propulsion program has been the stability of its Navy management, so that the Congress—and everyone else—knew exactly where the buck stopped, in good times as well as in less good ones. Indeed, *stability in management and stability in funding* likely constitute the majority of reasons why this program has been so singularly successful.

The Congress would do well to mandate and then oversee implementation of the same features "across the board" of the entire undersea military program. Providing such stability for RDT&E is especially important, for "beginnings are delicate times" in technology development and deployment, as in other matters.

Independent Periodic Assessments. For nearly 3,000 years, the principle that "no man is an apt judge of his own cause" has underlain Western jurisprudence. The Congress would be well-advised to apply this principle in assessing *all* military issues, specifically including those concerned with undersea warfare: independent technology and threat assessments likely would valuably inform Congressional consideration of submarine issues.

During most all of the Cold War, the undersea Navy enjoyed a degree of freedom from external scrutiny "so delightful as to be almost licentious." It is no longer clear that this is justified—or, the consequences of the Walker-Whitworth treachery considered, that it ever was. The Congress might aptly task other Government military technology agencies—e.g., ARPA and DOE—with major aspects of submarine and ASW technology assessment and periodic reporting, and might require annual independent threat assessments from, e.g., DIA and CIA with respect to all undersea issues. The basic National interest—and the Navy's ability to see its duty with surpassing clarity—seemingly would benefit significantly from the development and review of multiple perspectives on these crucial national security issues.

Sea Trials Of Mission-Specialized Prototypes. One of the several ways in which the submarine industrial base might be fully and productively employed which doesn't involve mass production of a single new class of submarine is the *prototyping of new submarine classes,* using efficiently both components of existing boats and newly created ones. Each of these new class prototypes might be specialized to one of the five quite different submarine mission areas noted above, and each of the two National submarine yards might be tasked with delivering a prototype for Navy evaluation in sea trials prior to any production decision-taking.

It seems to be established National policy with respect to most other major military platforms to "fly before you buy," both in order to better understand actual costs and to more reliably verify actual performance levels. Congressional establishment of such practices with respect to new submarines would seemingly benefit the development of a more versatile undersea force, one intrinsically more responsive to still-emerging military needs in the early 21st Century. An additional benefit of such an approach is an environment far more friendly to the timely insertion of high-leverage technology than the one presently contemplated. Such a Congressional mandate assuredly would preserve completely the American submarine industrial base, while offering outstanding opportunities to make good use of the huge margin of submarine force-in-being presently enjoyed by the United States.

Performance Certifications. It's undeniable—and notable—that future American submarines will cost far more (at least in dollar terms) than any other subs in the world. It is remarkable that the *Seawolfs* cost half as much as does a modern nuclear-powered aircraft carrier, and whatever emerges from the ongoing attempt to create new tactical submarines won't be much less expensive—no matter what the initial "close the sale" assurances might proclaim. Very high unit costs are "baked in the cake" of current American sub-buying practices.

The American people—and their representatives in Congress—might therefore reasonably expect that future American subs would be better than any others in all militarily relevant respects. To the extent that this will *not* be the case, it seemingly should be spelled out clearly—in advance—and rationalized. Toward such ends, the Congress might aptly require certification from the Navy *and* OSD with respect to new-American submarine performance figures relative to those of the contemporary boats of all potential adversaries in each and every major respect, each time Congressional authorization of procurement of a new submarine is requested. If some basic performance parameter is deemed not relevant for a particular submarine's mission, then an explicit waiver should be required of a statutory requirement for manifest, *across-the-board superiority* of American boats. Such a process will preclude unpleasant surprises, both military and political—ones of the types which otherwise seem likely within the next few decades.

Continuing Congressional Engagement. Accompanying all of the above is a need for continuing Congressional engagement with the Navy's best thinking and analysis, of the general character which is traditionally associated with congressional oversight proceedings which review mandated annual reporting and *ad hoc* certifications. Congressional oversight with which I'm familiar in this area has been highly commendable in its peak intensity, its intellectual acumen and its cogency, but has been less-than-perfect in its regularity and follow-through. Constancy and perseverance will be crucial in seeing future congressional mandates faithfully and efficiently translated into Navy programs and forces-in-being. Commitment of highly capable, single-job Congressional staff to such functions would have both symbolic and practical significance.

CONCLUSIONS. Overall, the undersea Navy performed splendidly during most all of the half-century duration Cold War; only quite recently has there been a "period of stagnation" which adversely shadows the future. Over a sufficient interval, the Navy will assuredly re-invent itself to serve the Nation's undersea military interests comparably excellently in the post-Cold War world. At issue are simply the time-scales on which it is likely to adapt via its traditional processes in seasons when the Nation is not at war, and whether these are acceptably short in a world which presently appears to be changing rapidly and not necessarily in directions entirely congenial to fundamental American interests.

If the Congress in its wisdom determines that the natural, peacetime generation to generation evolution of the Navy's institutional world view, RDT&E and procurement practices, force structures and operational approaches is sufficiently rapid, then essentially nothing need be done at the present time. If greater Navy responsiveness is determined to be required, then the above recommendations are respectfully submitted for congressional consideration.

I thank the committee once again for the opportunity to appear and comment on these matters of enduring significance for our Nation's security.

Senator COHEN. Thank you, Dr. Wood.

Let me say the Congress has finally recognized its responsibilities for the *Seawolf*—it was driven by cost. That is what Mr. Battista has been talking about. We simply could not afford to continue to build submarines at that level. So it is cost-driven more than a recognition that it was not meeting up to its responsibilities.

Second, we had a problem back in the late-70's, early-80's that Mr. Battista was well aware of, as we all sat around. We said we can continue. You are very bright individuals who have access to the academic community. We have people out there who can think of things, and next year they will think of new things, and technology is constantly revolutionizing itself in a matter of weeks and months. At some point you have got to build something. At some point you have to say this is the design, knowing that 20 years from now it is going to be obsolete. It may take us 6 years to build it today. It may be obsolete in 4 or 5. At some point we still have to build. That was the problem we had with the *Seawolf*.

So what we have to ask now is, how do we build things that can in fact anticipate that you are going to have revolutionary changes coming at you at the speed of light for all practical purposes, in terms of change that is necessary? That is something that I think you may have a valid point, that we have got to incorporate changes much more rapidly than we are currently planning on, and there is no money for that. We are not really doing much in the way of anything in the way of funding new technologies.

So that was the pressure that was on back in the eighties, saying, for God's sake, make a decision. Make a decision on some design. Because you can sit here all day, and there will be another panel come in next week and say that what Battista and Polmar and Wood are talking about, we have already gone beyond that.

Mr. BATTISTA. The point, though, Senator, is when we are addressing the *Seawolf*, I often quote Mendel Rivers, who was a committee chairman years ago, who said there is not any education from the second kick of the mule.

Senator COHEN. Fritz Hollings has said that many times.

Mr. BATTISTA. At the time, what I am saying is, if Congress had really exercised its oversight authority, we would be building the 5th, 6th, 7th, and 30th *Seawolf*. Why? Because we were telling them to go open architecture. They would not do it. We were telling them to go commercial off-the-shelf (COTS). They would not do it. So we really, collectively, are to blame for all of this.

So now, here you have the New Attack Submarine. I did not suggest you kill it. I suggest you fund it vigorously, because it represents a significant jump into the next generation of how to build. But I am also saying you know now that hydrodynamics are an important element of submarine survivability and performance. You knew it 10 years ago.

Now, it is okay to say I am in trouble for the next 5 years, but you do not want to be saying that 4 years from now. What I am suggesting to you is if you do not force the Navy into something beyond the New Attack Submarine, you are going to be sitting here 5 years from now going through the same drill. You are going to say, by God, the *Severodvinsk* has got hydrodynamic capability, it has got non-acoustic quieting, and here we are sitting around with this very good platform that just is not going to cut it.

I am saying you have got to find more money for the Navy submarine world if you are going to protect that carrier battle group, keep the sea lanes open—and I do not have a Cold War mentality. I have got a serious Russian threat concern.

Dr. WOOD. Mr. Chairman, a crucial point is that you do not make large block buys and buy them at one sub per year. I mean that is one way in which you legislate mediocrity for the long haul. If you are going to do a large block buy, get it over with quickly and go into another design cycle. Or if you cannot afford to buy more than one sub a year, legislate a small block buy. But the one sub per year and large block buys are a sure loser.

Senator COHEN. Mr. Polmar.

STATEMENT OF NORMAN POLMAR, SENIOR CONSULTANT, TECHMATICS, INC.

Mr. POLMAR. Thank you, Mr. Chairman.

The U.S. Navy submarine program is in trouble, and I think that has become very obvious by your having these hearings and by my colleagues here at the table and by what has been written and what has even been said by U.S. Navy seniors.

Last year, the Chief of Naval Operation, Admiral J.M. Boorda, revealed that the Soviet—and now Russian—Navy has several submarines at sea that are quieter than our latest. Boorda made a very interesting statement which I think I would have engraved in the near future and put over my desk: "This is the first time since we have put the *Nautilus* to sea that the Russians have had submarines at sea quieter than ours." As you know, quieting is everything in submarine warfare.

Senator COHEN. Did some of that come about as a result of the Russians acquiring some of our technology through Toshiba, as I recall?

Mr. POLMAR. Very little. Because if you look at how they have done this, how they build their submarines, it is very different than ours.

Senator COHEN. So our reaction to the Japanese transferring that technology was unwarranted?

Mr. POLMAR. I would say it was secondary for the following reason: It was propeller technology, the machinery that could produce high-speed propellers. If you look at the date that they got the technology and you look at when the Akula went to sea in 1985, Akula went to sea after they got that technology, but it was too close for them to have totally redesigned their propellers and tested them, produced them and installed them. What Toshiba did was make it easier for them to series produce these propellers, with better machinery than they probably had available.

But I would point out, sir, that in this quieting, the Russians have not given up speed, depth, survivability, and many other features of their submarines. I see no indications that they are going to give up any of these capabilities, and they are going to maintain their newly achieved quieting advantage.

If you look at what we have seen in Russian submarines in the last 3 decades, we have seen that they have surpassed us, and usually done so by surprise. That is, our intelligence did not predict how deep they would go, how fast they would go, the density level of their nuclear plants—as Mr. Battista was just explaining—the hydrodynamic flow, their knowledge of it, and their application, far superior to our application—I cannot argue about knowledge—automation, their submarines are much more automated than ours are, their development of wake-homing torpedoes, for which we still do not have a countermeasure, their development of high-speed or rocket torpedoes, which are now available on the open market and have the speed of about 180 knots, and finally, their quieting.

All of these came at either a faster rate or much greater quality than we predicted. Yet our analysts believe—and you were kind enough to call attention to these charts, one of which is in my paper—that their curve is going to level out to the way ours has. I can assure you there is no indication of that in Russia.

During the past 4 years, I have had the—I cannot say pleasure—the privilege of being there four times as a guest of their submarine design bureaus. Let me say that these people are striving to do better with every class. They are not going backwards. They are not constrained by dollars as far as quality goes. Quantity, yes. They have fewer submarines. They will be building fewer. But as far as quality goes, these guys are working at it and working hard.

Senator COHEN. I was under the impression that they were building at a rate far in excess of the U.S., and not down very much from the Cold War production rate.

Mr. POLMAR. I think I would argue, sir, that they are down significantly from the Cold War production rate. Since I am not sure what our building rate is, and their building rate is being greatly affected by not what is being appropriated for them to spend, but what is actually being paid out of the central banks, I would say that is a very hard call, who is building more today. But they are down significantly from what they were.

Senator COHEN. All right, we can talk about that in another session. There is quite a disparity then in terms of their production rate versus ours.

Mr. BATTISTA. Yes, sir, it is.

Mr. POLMAR. One of the more frightening aspects is that we had seven yards that could build nuclear submarines, if we go back to the 1960's. Today we are at two yards. They have also gone down from five yards to two yards building nuclear submarines—or they shortly will be at two, there are three right now. But just one of those yards has more capability, by a significant margin, than both of ours put together.

They can also do things in those yards that we cannot.

Senator LIEBERMAN. Can I interrupt, Mr. Chairman?

How are you measuring capability there, Mr. Polmar?

Mr. POLMAR. Number of building ways.

Senator COHEN. Of course, as you know, the whole purpose behind our competition is to winnow it down to one yard building submarines.

Mr. POLMAR. Yes, sir.

We see capabilities in their yards which we do not have, as far as such things as size of submarines, handling titanium, which is a metal we do not use in our submarines, and certain other features.

My paper, I would be grateful, sir, if you could insert it in the record, and I will go directly to a couple of proposals. One, I think we need a viable submarine development program. As my colleagues here, I have had the privilege of a 4-hour briefing last week on the New Attack Submarine. I agree it is an excellent design. It is not the submarine I want to see as the backbone of the U.S. Navy 30 years from now.

I think we definitely should go to a term that we have thrown out here of operational prototypes.

Senator COHEN. What does that mean?

Mr. POLMAR. This is building one or two of a specific type of submarine in order to evaluate technologies, production techniques, and new equipment and new systems.

Senator COHEN. Now, Mr. Battista, do you agree, is that the same as your concept of an operational prototype?

Mr. BATTISTA. That is the same as mine, and one that affords you the ability to break out, if you have to, and convert it to a combat submarine.

Senator COHEN. Is your collective figure roughly $8 billion in order to achieve these four prototypes?

Mr. POLMAR. Yes, sir. In gross terms, yes, sir.

Dr. WOOD. That is also the sense in which I use the term, sir.

Senator COHEN. Please explain that.

Dr. WOOD. Their sense is also the sense in which I used the term "operational prototype."

Mr. POLMAR. We used to do this. In my paper I provide a list of the one-of-a-kind subs, the *Nautilus, Seawolf, Halibut, Triton, Narwhal, NR–1*—

Senator COHEN. Are we looking at $2 billion per ship?

Mr. POLMAR. No. We are looking at about $1.5 billion a ship and the rest in the technology, R&D, production techniques, and other nonactual construction cost.

Senator LIEBERMAN. Mr. Polmar, let me understand, in your proposal would you do these four prototypes along side the beginning of the New Attack Submarine program?

Mr. POLMAR. No. What I would do is, at this stage continue with the first New Attack Submarine the way the Navy is planning it, and then I would turn around to Electric Boat, and I would turn around the Newport News, and say these are the reactors, or this is the reactor that can be available in 5 years. You tell me what submarine you want to put around it that provides us the greatest capability for 30 years from now. We are sort of stuck with the reactors we have, and there are about three designs.

So give the two yards—and there are brilliant people at both of those yards. I have had the privilege of spending a lot of time at one of them, one short visit to the other, but I have talked to people from them and they have got good ideas, and they are really well-grounded.

One problem is those ideas rarely leave Newport News and Groton because of the bureaucracy we have, and I will address that in a moment.

The Navy's biggest opposition to operational prototypes is, it is a nightmare to support different submarines in the fleet, and that, sir—I am having trouble coming up with the right word to use that is acceptable in these halls, but that is not correct.

Right now, today, March 21st, 1996, the U.S. Navy is supporting seven different subtypes within the *Los Angeles* class, the attack submarine *Narwhal,* two ex-Polaris subs employed as transports, the *Memphis,* which is an R&D submarine, the *NR–1,* the *Dolphin,* our only diesel sub, several *Sturgeon* class submarines with variations there of long hull, short hull, special purpose, and Trident submarines.

Operational prototypes will let us take all of this technology which is exploding around us and saying, instead of putting it into one hull which has to be a lower cost hull than the *Seawolf* and a smaller hull, let us build two or three or four with different approaches to employ this technology and then at the end of 5, 6, 7 years say, okay, we have looked at this technology in the system of a submarine and we have put it to sea for a year until we have wrung it out, now let us go into series production.

This is exactly what we did to get the SSN 688 because there was a competitor, the *Lipscomb* class. That design, which used a different type of power plant, nuclear, but a different type of power plant, was also proposed for series production. It was a slower but quieter submarine. We went for the SSN 688. We wanted the speed, because the Russians had surprised us with speed.

So I would say first, I strongly urge us to go to an operational prototype or a multiple type, rather than locking in today on a design that is excellent, but in many respects it is inferior to what the Russians are doing and to what we have done in the *Seawolf.*

My second point is the SubTec program, which the Congress initiated in 1987 and in 1991 was folded into the Navy and is now being resurrected, must be funded at a level of funding that keeps it going, and we are not talking about a lot, just a couple of hundred million a year, a minimum of, perhaps, $150 million a year, but the submarine technology program, to pull in bits and pieces from this explosion and keep it alive within the submarine bureaucracy I think is vital.

The third area is what I call the Red Team approach, objective reviews of what we are doing by a non-Navy group. We certainly see this in Admiral Baciocco's panel, and read their report carefully, sir: They identify weaknesses that 1 year ago, if you had dared to address those weaknesses with the Navy submarine community, it could not be discussed in the open.

But Admiral Baciocco, thanks to Mr. Douglass, had enough of a charter that he could go into the minus as well as the plus side of the ledger. It is important we understand what our shortfalls are, and I am not proposing you promote him to full Admiral on the retired list, but I think he has done a great service to the Navy and to the Nation by incorporating in his report what the shortfalls are of the program, and that is the Red Team approach. Get somebody objective there to look at it, someone who is not trying to push a specific design or class or type of ship.

Fourth, what we have discussed already today, the *Los Angeles* class updating. As a taxpayer, I think it is ludicrous that we are retiring these submarines with 10, 12, 14 years of service life remaining. Modernizing, updating, converting some of these submarines can help fill the submarine yard's gap, both the overhaul yards and the two construction yards, while we figure out what we want to do with an operational prototype program.

Senator COHEN. How about an arsenal ship?

Mr. POLMAR. Absolutely, because you could add a section, and we actually did this with the *Skipjack* class. We did it on paper in the late fifties. To get the Polaris we inserted a 130-foot section and got 16 strategic missiles. We can put a 100-foot section in a 688, probably get between 75 and 100 Tomahawk land attack missiles.

The great irony is, the Russians have done this. They have taken two or three of their *Yankee* class submarines into the yard, the Little Star Yard at Severodvinsk, chopped them in half—rather, chopped them in three parts, pulled out the ballistic missile section and put in a cruise missile section, and we can do this, and I point out the Little Star Yard is not a construction yard but an overhaul yard, for those of us who are interested in keeping other shipyards in the submarine business.

Senator COHEN. The Portsmouth Naval Shipyard.

Mr. POLMAR. Certainly, sir, but that is in New Hampshire, not in Maine, sir. [Laughter.]

Senator COHEN. That is in Kittery. [Laughter.]

Mr. POLMAR. Oops. Yes sir. My fifth and final point is, the structure we have now for designing, managing, and putting together our submarine force is not conducive to progress.

I would specifically recommend that a submarine technology office be established under the assistant Secretary of the Navy for Research, Development, and Acquisition, headed by a senior two-star Admiral who should be double-hatted into the Office of Naval Research and into DARPA, so there is one focal point within the Navy outside of the shipbuilding community where new technology can be fostered.

Further, at this stage I think we have to reexamine the status of the nuclear-powered directorate within the Navy. Having a four-star Admiral running a safety and training program in this day and age I think is a waste of manpower and also is not conducive to an effective organization for designing and producing nuclear submarines.

The incumbent Director of Naval Nuclear Propulsion is scheduled to retire this year after an 8-year tenure. Thus, I think there is a good opportunity for the Congress and the Navy's leadership to review this structure.

As we have just heard, Russian submarine technology is no longer catching up with our submarine force. It has surpassed us in many areas, including quieting now, the one area that we always claimed gave us total advantage over the Russians. This is ludicrous, because I think our technology, I think our scientists, our engineers, our shipbuilders, I believe they are superior to the

Russians, but we have a system that has prevented us from exploiting that.

Allow me to conclude, Mr. Chairman, by saying the Navy, the Department of Defense, and especially the Congress, has an opportunity to take a deep breath and conceive a submarine program that the United States should have for the 21st Century. We could never afford to do that during the Cold War, because we could not stop. There was too much momentum, and too much fear that war could break out in a day, a week, a month.

But today, gentlemen, the Cold War is over. We have an opportunity to take a moment, review the options, look at the alternatives, and make decisions that will produce the best submarine this country can produce, which will be around for 20 or 30 years, long after all of us are doing something else.

Thank you very much, Mr. Chairman.

[The prepared statement of Mr. Polmar follows:]

PREPARED STATEMENT BY NORMAN POLMAR

The U.S. submarine program is in trouble.

- When the Soviet Union fell and the Cold War ended, the only U.S. warship program that was completely canceled was the *Seawolf* attack submarine.
- Under pressure from Congress the second and third *Seawolf* submarines were authorized to keep the industrial base open. The third *Seawolf* will cost in excess of $3 *billion*. That is more than the cost of two 40,000-ton amphibious assault ships, or two-thirds the cost of a 96,000-ton nuclear attack carrier.
- At the same time, the Navy is retiring more than a score of nuclear submarines of the *Los Angeles* class, ships with up to 14 years of service life remaining—expensive ships, some being cut up just past the half-way point in their expected service life.
- But we are short of submarines: Last year the Commander Submarine Force, Pacific Fleet declared that we will have problems in retaining enlisted submariners because of the high operational tempo—"more demands for submarines in the Pacific than we can possibly fill."[1]
- A New Attack Submarine (NSSN) is being designed for production in place of the *Seawolf* class. Last week the Navy provided me with a 4-hour briefing on the NSSN; it is an excellent design. But it is not the submarine that we should have as the backbone of the U.S. submarine force 20 to 30 years from now.
- During the past three decades the U.S. submarine force has been surpassed by Soviet submarines in speed, depth, wake reduction, weapons payload, survivability,[2] and other features. This was done in the belief that U.S. submarines would always have acoustic superiority—specially that U.S. submarine would be quieter.

Last year the Chief of Naval Operations, Adm. J.M. Boorda, revealed that the Russian Navy has several submarines at sea that are quieter than the latest U.S. submarines of the Improved *Los Angeles* class. His statement reveals that the United States is losing what has long been touted as the primary—and most important—U.S. advantage over Soviet-Russian undersea craft.[3] To quote Admiral Boorda:

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[1] Rear Adm. Jon M. Barr, USN, presentation to Naval Submarine League, Arlington, Va., 6 June 1995. Barr also declared that "retention is not good" in his command, with "bleak career prospects for junior officers." He attributed the situation to the submarine force "not having a focused mission to justify [why] we do long time at sea."

[2] The Russians use the term "unsinkability"; this involves the use of double hull, high reserve buoyancy, internal compartmentation, and other features to enable a submarine to survive the complete flooding of at least one compartment.

[3] Admiral Boorda, luncheon meeting with Naval & Maritime Correspondents Circle, Washington, D.C., 27 February 1995. Russia Navy has completed six of these Improved *Akula*-class submarines; a still more capable *Akula* II submarine went to sea in 1995.

> This is the first time since we put *Nautilus* to sea that [the Russians] have had submarines at sea quieter than ours. As you know, quieting is everything in submarine warfare.[4]

The Russian design bureaus have achieved this level of quieting without sacrificing the speed, depth, survivability, and other features of their submarines. I see no indications that the Russians are not seeking to retain this newly achieved quieting advantage.

Today Russia is a Third World country. Its political system, its economy, its industry, and its military forces are all in disarray. Yet we see three areas of military technology that the Russians are continuing to develop at a significant rate, areas in which they are competitive if not superior to the United States. These areas are:

- Military use of space
- Tactical aircraft
- Submarines

Submarines are important to the defense posture of the United States. They are valuable in peacetime, in crisis, and in war. But the large amounts of money that we are allocating to submarine programs should provide us with a much better submarine force.

Further, the U.S. Navy has been "surprised" too often during the Cold War era by Soviet-Russian submarine developments. These surprises have included the following submarine/weapon developments:[5]

1. Depth
    —*Paltus*/Uniform AGSSN (3,000–6,000+ft)
    —*Hike* SSN (3,000+ft)
    —*Alfa* SSN (2,000–2,500 ft)
2. Speed
    —*Papa* SSGN (44.7 knots)
    —*Alfa* SSN (43 knots)
    —*Akula* SSN (35+knots)
3. High-density nuclear plants
4. Hydrodynamic flow
5. Automation
6. Wake-homing torpedoes
7. Rocket/high-speed torpedoes
    —approx. 180 knots
8. Quieting

Why do our submarine analysts believe that we will not be surprised again by Russian submarine developments? In the early 1980s the third generation of Soviet submarines began going to sea. American SSNs trailing those undersea craft and SOSUS detections discovered noise levels much lower than predicted.[6] The Director of Naval Intelligence, Rear Admiral Thomas A. Brooks, explained, "[the] *Akula* produces noise levels that the United States had not projected the Soviets to attain until the early 1990s."[7] The Soviet quieting technology was several years ahead of U.S. intelligence predictions—the gap was closing more rapidly than expected.

Concern for Soviet advances in submarine quieting led a senior U.S. submarine designer to declare that "there will come a time in the not too distant future when Soviet submarine silencing will have improved to the extent that detection by passive sonar is possible only at short ranges, if at all."[8]

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[4] Admiral Boorda, testimony before the National Security Committee, House of Representatives, 22 February 1995.

[5] This list of characteristics has been reviewed by the United States and Royal Navy intelligence staffs; while they are not fully agreed as to whether or not each constitutes a "surprise" to the Western submarine communities, one or both of the two intelligence staffs have agreed to all eight characteristics having been a surprise to the West.

[6] SOSUS is the sea floor *SO*und *SU*rveillance *S*ystem. The Soviet third-generation submarines were:

Type, NATO Name, Project No., and Year Completed

SSGN—Oscar—949—1982
SSBN—Typhoon—941—1983
SSN—Sierra—945—1984
SSBN—Delta IV—667BDRM—1985
SSN—Akula—971—1985

[7] Rear Admiral Brooks, testimony before the Seapower, Strategic, and Critical Materials Subcommittee of the House Armed Services Committee, 22 February 1989.

[8] Capt. Harry A. Jackson, U.S. Navy (Ret.), et. al., "ASW: Revolution or Evolution," U.S. Naval Institute *Proceedings* (September 1986), p. 68.

This view of the trend in Soviet submarine development was confirmed by a top-level study panel sponsored by the House of Representatives, which concluded that because of Soviet submarine developments, "We believe that the [U.S.] Navy must, in effect, 'start over' in its approach to ASW."[9]

Addressing specific Soviet submarine developments—called into focus' by the unexpected low noise levels of the Akula—the report continued:

> . . . it is true that the Soviets' submarine R&D [research and development] program is extremely ambitious, [it] seems to over-look no promising technologies, and—in that it dates back many years—is no flash in the pan. As a result of their years of intensive research it appears that the Soviets may well be ahead of us in certain technologies, such as titanium structures and control of the hydrodynamic flow around a submarine.
>
> But far more important is the improvement that the Soviets have made in submarine quieting. The problem is not that Soviet submarines are now quieter than ours; they are not. But after decades of building comparatively noisy submarines, the Soviets have now begun to build submarines that are quiet enough to present for us a major technological challenge with profound national security implications.[10] '

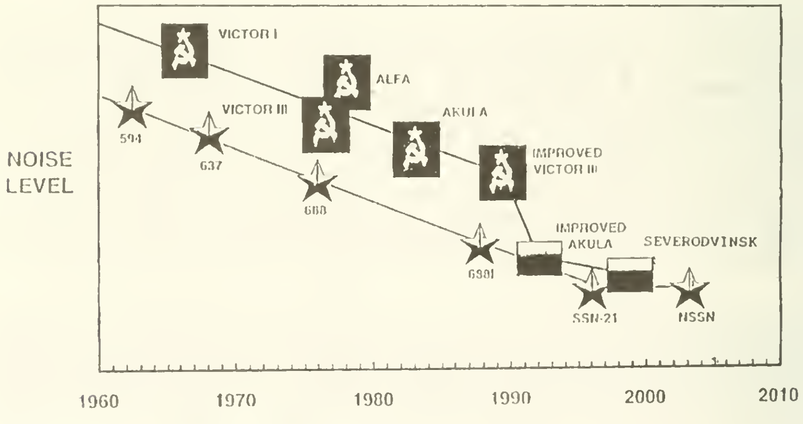
This pivotal study should have rung alarm bells throughout the U.S. submarine and R&D communities. But it appears to have had little impact on the U.S. submarine leadership.

However, the report did reinforce congressional support of the important Submarine Technology program of the Advanced Research Projects Agency (ARPA), and several analytical efforts by the Central Intelligence Agency and private study organizations.

A few years later—in 1994–1995—it became known that the gap had been closed when the Improved *Akula* SSNs were determined to be quieter than the latest American submarines at sea—the Improved *Los Angeles* class.

The Russians are now building the *Severodvinsk* (Project 885), their fourth-generation SSN. U.S. naval analysts contend that the *Severodvinsk* SSN will be only slightly quieter than the Improved *Akula* (see Figure 1).

FIGURE 1.—SUBMARINE BROAD-BAND QUIETING



The leadership of the U.S. nuclear submarine community believes that the latest U.S. submarine design, the *Seawolf*, will be the world's quietest submarine when she goes to sea later this year. Quieting was the highest priority in the design of the *Seawolf*.

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[9] Report of the Advisory Panel on Submarine and Antisubmarine Warfare to the Subcommittees on Research and Development, and Seapower and Strategic and Critical Materials, House Armed Services Committee, 30 January 1989, p. 2.

[10] Report of the Advisory Panel, Appendix, p. 1.

But unknown is how quiet will the *Severodvinsk* be? The U.S. Navy's intelligence estimate—driven to a significant degree by the nuclear submarine community—indicates that the *Severodvinsk* will have almost the same noise levels as the Improved *Akula*. This has become an important issue because the New Attack Submarine (NSSN), the follow-on to the truncated *Seawolf* program, will have the same level of quieting as the earlier *Seawolf*. Most if not all other NSSN characteristics will be inferior to those of the *Seawolf* (speed, depth, weapons, etc.).

Recalling the Soviet-Russian "surprises" in submarine quieting in the early 1980s and again in 1994, one must be apprehensive of U.S. predictions in this area. In general, our predictions are based on the characteristics of older Russian submarines as they come out of overhauls, often revealing lower noise levels. There are other sources—both open and clandestine—that shed light on future Russian submarine developments. But if the past is any guide to the future, it is more likely that the *Severodvinsk* will be significantly quieter than the Improved *Akula*—and quieter than the *Seawolf*, which was designed several years before the *Severodvinsk*. Discussions that I have had with senior officials of Russia's Rubin and Malachite design bureaus reinforce the view that future Russian submarines will be quieter and have improved performance.[11] Based on available information, there is little reason to believe that the Russian Navy will not maintain its new found leadership in submarine quieting.

Significantly, the displacement or volume growth of Soviet submarines has not been proportional to their improvements in quieting. The U.S. Navy has used primarily an "add-on" method of quieting wherein each submarine design followed the basic SKIPJACK configuration (i.e., ALBACORE/AGSS–569 "tear-drop" hull and S5W reactor plant) with changes made to counter specific noise sources. The Soviets appear to employ more of a "systems approach" with successive submarine designs having an overall, integrated quieting effort. Significantly, Soviet-Russian quieting has been accomplished without the major increases in size that have accompanied past U.S. submarine quieting efforts. For example, as shown in Figure 1, the *Alfa* submarine was quieter than the *Victor* I design but the *Alfa* was both smaller and faster:

NATO name	Project	Displacement	Horsepower	Speed
Victor I	671	5,000 tons	30,000 shp	33 knots.
Alfa	705	3,800 tons	47,000 shp	43 knots.

These and other advances have been possible, in large part, because of the high degree of independence of the three Soviet submarine design bureaus: Rubin and Malachite in Leningrad/St. Petersburg, and Lazarite in Gor'kiy/Nizhny Novgorod, and several related research institutes.[12] In contrast, U.S. submarine research, development, and design efforts are very closely and narrowly controlled by the Naval Nuclear Propulsion Directorate.

Early on the Soviets worked at reducing hydrodynamic flow noises. This can be seen by the blending of sail into the hull, flow-control structures (strakes), covers over limber holes, and other features, some of which are now incorporated into the U.S. *Seawolf* and New Attack Submarine (NSSN) designs. Soviet-Russian propulsion quieting includes rafting of turbines (introduced in the *Victor* SSN), advanced propeller designs, and other features that are also employed in U.S. submarines. Building on German development of the Alberich anechoic coatings in World War II, the Russians have produced what appear to be multi-purpose coatings, which reduce the effectiveness of Allied homing torpedoes by absorbing their active sonar pulses and also help to mask internal noises. The Russians are reported to employ multiple coatings in their double-hull submarines, further masking internal noises. (The coatings also affect water flow over the hull, reducing flow noises as well as cutting drag.)

Russians efforts to reduce submarine noises include a unique scheme of active noise cancellation. This method of quieting measures certain noise frequencies and produces—in real time—a canceling tone. There are also indications that the Russians have tested the injecting of polymer substances into a turbulent boundary layer around submarines not only to reduce drag and possibly to reduce flow noises. This scheme would be particularly important for increasing "quiet speed," the speed at which a submarine can still use its own passive sonar.

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[11] Rubin and Malachite are the Russian submarine design bureaus, both located in St. Petersburg. Mr. Polmar visited the Rubin bureau for technical discussions in November 1992, May 1994, and September 1994; he also visited the Malachite bureau in September 1994. Academician I.G. Spassky, head of the Rubin bureau, was Mr. Polmar's guest in the United States in October 1993 for further discussions.

[12] Lazarite apparently no longer designs combat submarines.

The current political and economic conditions in Russia mitigate against an effective submarine program. The *Severodvinsk* is known to be significantly behind schedule and the follow-on, fifth-generation Russian SSN, whose design is well underway, is far from being funded. Still, if quieting is the key to U.S. nuclear submarine effectiveness—as long touted by the U.S. submarine community—there are rough waters ahead.

In my opinion there is a "window of opportunity" over the next few years as Russian submarine development, despite technological progress, is in disarray because of the general situation of the Russian state and armed forces. Hopefully the United States can take advantage of this window in time to (1) objectively evaluate the U.S. submarine situation and the relative importance of various submarine characteristics, including quieting, and (2) pursue innovative approaches to regaining submarine superiority.

I would respectfully propose to this committee consideration of the following actions. I would stress that these actions are possible today—in our window of opportunity—and could not have been undertaken during the Cold War because we could not risk slowing the production of submarines.

Accordingly, I propose:

1. *A Viable Submarine Development Program:* During the 1950s and 1960s the U.S. Navy had a viable and innovative submarine development program; Appendix A to this statement provides a list of all nuclear-propelled submarine designs put to sea by the United States and the Soviet Union-Russia. Note the large number of designs developed by the United States during this period; but the decades of the 1970s and 1980s saw Soviet innovation come forth. I submit that continuing the currently planned U.S. Navy program of submarine development—building the third *Seawolf* and beginning the New Attack Submarine (NSSN) in fiscal 1998—will not regain under-water superiority for the United States.

Rather, the United States should initiate competitive submarine design programs at the General Dynamics/Electric Boat and the Newport News Shipbuilding yards. The yards should each design and construct an Operational Prototype (OP) of an advanced combat submarine that could serve as the model for series production. As detailed designs are completed, the Navy could initiate production of the more promising OP design in fiscal 2002 or, alternatively, continue this "fly-before-you-buy" concept by pursuing additional Operational Prototypes.

The following is a proposed schedule for this concept:

Fiscal year 1998	Fiscal year 1999	Fiscal year 2000	Fiscal year 2001	Fiscal year 2002	Fiscal year 2003
OP–1 (Electric Boat).	OP–2 Newport News).	Design Review	Design Review	New SSN Production or OP–3.	New SSN Production or OP–4

I would stress that these Operational Prototype submarines would be fully combat capable—as were the prototype U.S. *Nautilus* and *Seawolf*, and the Soviet Mike (*Komsomolets*), the latter built to evaluate 12 advanced technologies while having an attack submarine combat capability.[13]

The program that I propose would cost more than now planned for the NSSN program, but an innovative approach—which does not commit the United States to producing submarines inferior to foreign undersea craft—must be undertaken.

2. *Restart the SubTech Program:* Congress must support the ARPA Submarine Technology (SubTech) program, which Congress originally initiated in 1987 and continued for several years until it was absorbed by the Navy in 1991. This program was one of the most innovative technology efforts undertaken by the U.S. defense establishment since the founding of ARPA in the late 1950s.

This effort is needed because, as the House Armed Services Committee's ASW report of 1989 stated, "the Navy establishment—like many organizations of comparable size and age—is burdened with traditional, deeply rooted, and powerful vested interests that encumber innovation on the scale required" to counter Soviet

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[13] The *Komsomolets* SSN was completed in 1986. After extensive trials she undertook a "combat" patrol. On 7 April 1989 she suffered a fire while returning from that first patrol. The *Komsomolets* was able to surface and the fire was fought for several hours before the submarine began flooding and sank 112 n.miles southeast of Bear Island, off the Norwegian coast. (Of her crew of 69 men, 42 were lost.)

Russian developments.[14] This situation remains true today, although some progress has been made by the Office of Naval Research under its current director.[15]

This vital effort could be continued at the cost of as little as $150 million per year in an Advanced SubTech program jointly directed by ARPA and the Office of Naval Research. The actual research and development activities would he undertaken by the Navy's laboratory complex, the Los Alamos and possibly Livermore national laboratories, and private contractors.

3. *A Red Team Approach to Objective Review:* U.S. Navy submarine programs must be reviewed by an objective, non-Navy group to bring a non-institutional review to these important efforts before they are formally proposed for Milestone 0 review. The effectiveness of this scheme have been demonstrated by the Defense Science Board, the Naval Research Advisory Committee (NRAC), and Chief of Naval Operations Executive Panel reviews of various Navy programs.

This concept—using a review by non-institutional personnel who seek objectivity—is akin to the B-Team set up by the Central Intelligence Agency in 1975 to help obtain objective reviews of its estimates of Soviet strategic force development. Such a submarine oriented Red Team should be comprised of non-submarine specialists, from multiple disciplines, and should be established for a period of at least 3 to 5 years. The team should report directly to the Secretary of the Navy and Chief of Naval Operations.

4. *Upgrading Los Angeles Submarines:* The retirement and scraping of *Los Angeles*-class submarines with a decade or more of service life remaining is ludicrous. Conversion of these submarines to specialized missions must be objectively analyzed. We have considerable experience in such conversions, such as converting the *Skipjack* submarine design to the first *Polaris* strategic missile submarines, and, more recently, converting the attack submarine *Parche* to a deep-sea search/recovery submarine with the addition of a 100-foot section and other features. The Soviets have similarly converted several of their *Yankee* ballistic missile submarines into cruise missile strike submarines.

I strongly urge consideration of converting some of the *Los Angeles*-class attack submarine to the so-called arsenal ship or strike role. Such conversions would provide perhaps 100 Tomahawk land-attack missiles in a submarine that retains stealth and all SSN combat features. These and other specialized configurations will help make use of these submarines that we have purchased at great cost, while providing capabilities that will be highly useful in probable future naval operations in littoral areas.[16]

5. *A Structure Conducive to Progress:* The Navy's leadership should review the current structure within the Navy for submarine technology, design, and development. Specifically, a Submarine Technology Office should be established directly under the Assistant Secretary of the Navy (RD&A); that Office should be directed by a rear admiral (upper half), who should be double hatted as the submarine technology sponsor in the Office of Naval Research (ONR) and in the Advanced Research Projects Agency (ARPA).

The Submarine Technology Office should have the task of coordinating and directing all internal Navy and external research and development in this field. This position is necessary to overcome the current malaise and confusion over submarine technology development, and to help insure continuous and realistic funding for submarine technology. In particular, the Submarine Technology Office should be tasked with developing the Navy's SUBTECH program and funding profile, based on 5-year increments, that will be incorporated into the Navy and DOD budget requests. This SUBTECH program should also be a component of the existing Submarine Master Plan.

Further, the status of the Naval Nuclear Propulsion Directorate (NR) must be reviewed and modified accordingly. NR was established in the late 1940s, with the director, then-Capt. H.G. Rickover, double-hatted to the Atomic Energy Commission (now Department of Energy). That organization served the Navy and the nation well for many years, developing a most enviable safety record for naval nuclear propulsion and for personnel training.

However, both safety and training have now been highly institutionalized within the Navy. The situation of having a four-star director of safety/training, who has direct influence on submarine design and—in some respects—more influence than the Commander, Naval Sea Systems Command (three stars), or the senior Submarine Force Commander (three stars), or the submarine program manager (too stars) should be carefully and objectively reviewed.

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[14] Report of the Advisory Committee, p. 1.

[15] The current Chief of Naval Research, Rear Adm. Marc Y.E. Pelaez, was previously assigned to the ARPA SubTech program.

[16] These conversion alternatives are discussed in N. Polmar, "There Are Alternatives to the Third *Seawolf*," U.S. Naval Institute *Proceedings* (March 1995), pp. 121–122; the article is enclosed to the statement as Appendix B.

The incumbent Director, Naval Nuclear Propulsion is scheduled to retire this year after an 8-year tenure, thus there is an opportunity for Congress and the Navy's leadership to review this structure.

Russian submarine technology is no longer "catching up" with our submarine force. It has surpassed us in many areas—including quieting, considered by many experts to be the key factor in submarine warfare.

The third *Seawolf* and the New Attack Submarine will not return leadership in submarine warfare to the United States. To do so we require a high priority national effort, a new approach to submarine development, an increase in funding, and an improved Navy submarine organization.

Thank you for this opportunity to present my views to you.

APPENDIX A

Years	United States	Soviet Union-Russia
	NUCLEAR SUBMARINE DESIGNS	
1955–1960	SSN NAUTILUS [1]	SSN November
	SSN SEAWOLF [1]	SSN Mod. November (#645) [1]
	SSN SKATE	SSBN Hotel
	SSN SKIPJACK	SSGN Echo I
	SSBN GEO. WASHINGTON.	
	SSGN HALIBUT [1].	
	SSRN TRITON [1].	
1961–1970	SSN THRESHER	SSN Alfa
	SSN TULLIBEE [1]	SSN Victor I
	SSN STURGEON	SSGN Echo II
	SSN NARWHAL [1]	SSGN Charlie I
	SSBN ETHAN ALLEN	SSBN Yankee
	SSBN LAFAYETTE.	
	SSBN BENJ. FRANKLIN.	
	SSXN NR–1 [1].	
1971–1980	SSN LIPSCOMB [1]	SSN Victor II
	SSN LOS ANGELES	SSN Victor III
		SSGN Papa [1]
		SSGN Charlie II
		SSBN Delta I
		SSBN Delta II
		SSBN Delta III
1981–1990	SSBN OHIO	SSN Sierra I
	SSN Improved LOS ANGELES	SSN Sierra II
		SSN Mike [1]
		SSN Akula
		SSGN Oscar I
		SSGN Oscar II
		SSBN Delta IV
		SSBN Typhoon
		AGSSN X-Ray [1]
		AGSSN Uniform
		AGSSN Pultas
1991–2000	SSN SEAWOLF	SSN Improved Akula
		SSN Akula II
		SSN SEVERODVINSK
	NON-NUCLEAR SUBMARINE DESIGNS	
1950–1960	SS TANG	SS Whiskey

APPENDIX A—Continued

Years	United States	Soviet Union-Russia
	SS DARTER[1]	SS Zulu
	SS BARBEL	SS Quebec
	SSK HI	SS Romeo
	SSG GRAY BACK	SS Foxtrot
	SSR SAILFISH	SSB Zulu
	AGSS ALBACORE[1]	SSB Golf
	SST T–1	SSX Whale[1]
1961–1970	AGSS DOLPHIN[1]	SSG Juliett
		SST Bravo
1971–1980	(none)	SS Tango
		SSX Lima[1]
		SSX India
1981–1990	(none)	SS Kilo
		SSX Beluga[1]
1991–2000	(none)	SS Improved Kilo

NOTES

[1] One-of-a-kind submarine.

SS/SSN=torpedo attack submarine.
SSB/SSBN=ballistic missile submarine.
SSG/SSGN=guided (cruise) missile submarine.
SSR/SSRN=radar picket submarine.
SST=training/target submarine.
SSX=research/special purpose.

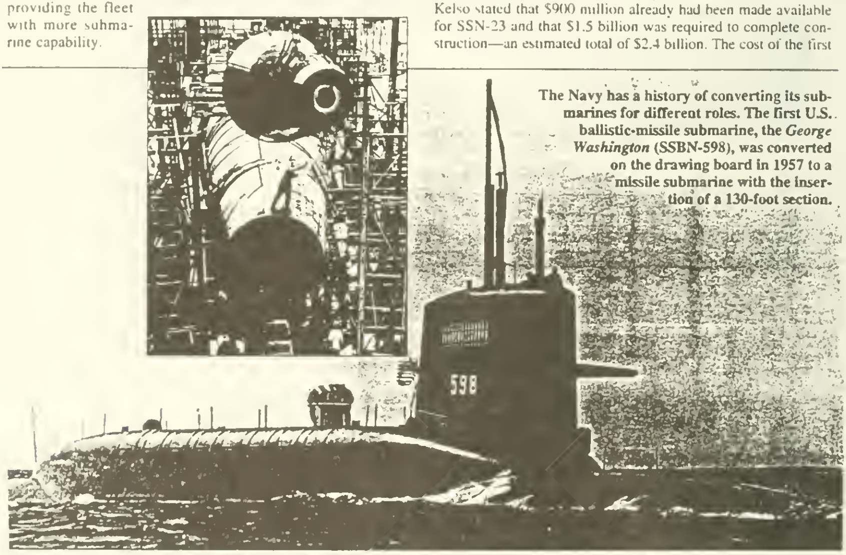
APPENDIX B

THE U.S. NAVY

By Norman Polmar, Author, *The Ships and Aircraft of the U.S. Fleet*

There Are Alternatives to the Third *Seawolf*

Although attack submarine force levels are being reduced, the value of a third *Seawolf* is being questioned, and the cost of the *Seawolf* program continues to climb, the U.S. Congress now is considering the funding of a third nuclear-powered attack submarine of the *Seawolf* (SSN-21) class in the fiscal year 1996 budget. The principal reason for pursuing this submarine is to keep the submarine construction line open at the General Dynamics/Electric Boat yard. However, there may be more constructive ways to keep the yard "hot" while providing the fleet with more submarine capability.



The Navy has a history of converting its submarines for different roles. The first U.S. ballistic-missile submarine, the *George Washington* (SSBN-598), was converted on the drawing board in 1957 to a missile submarine with the insertion of a 130-foot section.

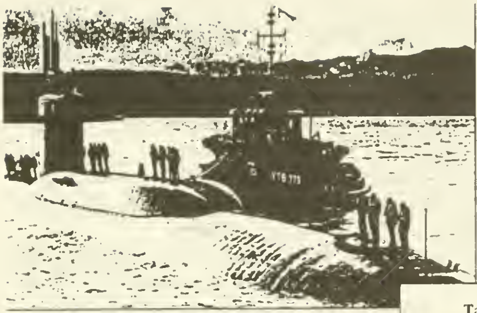
U.S. NAVY/INSET: GENERAL DYNAMICS/ELECTRIC BOAT

The recent Department of Defense-sponsored Bottom-Up Review concluded that by 2000, the Navy's attack submarine (SSN) requirement will be 55 submarines, thereafter possibly declining to 45 SSNs. There are now 84 attack submarines in commission—some already inactive and being prepared for disposal—and 8 SSNs under construction (see Table 1). Thus, by 2000, the Navy will have to discard at least 35 SSNs to meet the 55-submarine force level. The newest of these submarines being discarded was completed in 1981—a submarine with a 30-year service life that could be retained in service until about 2011. The result will be a tremendous loss of capital investment.

In this context, it "pays" to build new submarines only to advance our technology base or to preserve the industrial base. Two *Seawolf*-class submarines now are under construction and will not add significantly to the submarine technology base. A third *Seawolf* (the SSN-23) will not further that, and there is no need for an additional SSN to meet force-level goals. Rather, the third *Seawolf* is wanted to keep the submarine production line at Electric Boat "hot" until the planned New Attack Submarine (NSSN) is authorized in fiscal year 1998. (The Navy is allowing Newport News Shipbuilding in Virginia to go out of the submarine business; that yard will retain a nuclear capability through its aircraft carrier work.)

In his briefing, "Reconstructing Naval Forces," on 18 January 1994, then-Chief of Naval Operations Admiral Frank B. Kelso stated that $900 million already had been made available for SSN-23 and that $1.5 billion was required to complete construction—an estimated total of $2.4 billion. The cost of the first two *Seawolfs*, which already are under construction, has increased over the past year, and, given the *Seawolf* program's track record, there is reason to believe that the third unit (not yet started) will increase beyond that estimate. The latest *Seawolf* cost increases, announced in January 1995, led to the reassignment of two rear admirals at Naval Sea Systems Command.

There are alternatives to building the third *Seawolf* that would keep the Electric Boat yard active. One would be to make use of the remaining service life—in some instances, almost 15 years—of *Los Angeles* (SSN-688)-class submarines that will be stricken. The conversion of several *Los Angeles* SSNs to special-mission submarines could:



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The attack submarine *Parche* (SSN-683) was converted during 1987-1991 to a deep-sea search/recovery submarine with the addition of a 100-foot section.

- ➤ Keep Electric Boat producing outfitted submarine hull sections
- ➤ Increase fleet capabilities
- ➤ Recapture some of the tremendous investment in these submarines.

Various "inserts" could be made to SSN-688s to convert them to specialized submarines for Tomahawk missile launch, mine-laying, carrying underwater vehicles and recovery systems, and other combat or support roles. Such a program, at a cost of perhaps $500 million per submarine, could fund the conversion and refueling of three SSN-688s to specialized roles (i.e., using the $1.5 billion or more needed to complete the SSN-23). Three such specialized submarines would enhance U.S. submarine force capabilities far more than would a third *Seawolf*.

In addition, more than the $1.5 billion that has been identified as needed to complete the SSN-23 may be available for such an endeavor. Admiral Kelso identified $900 million as already having been spent on the SSN-23, but the Congressional Research Service has identified a formal obligation of only $678.7 million as of 1 January 1995.[1] Of that amount, only $382.5 million actually has been expended. Thus, another $500 million or more actually could be available—less some amount for contract cancellations—for SSN-23 alternatives.

The concept of converting submarines to different roles, including the insertion of major hull sections, has been used by the U.S. Navy for more than half a century. For example, at the end of World War II, several diesel-electric submarines were converted to the radar picket role by the insertion of 30-foot hull sections and other changes.

The best-known U.S. submarine "conversion" was the addition of a 130-foot section to the *Skipjack* (SSN-585) design to produce the first U.S. ballistic missile submarines of the *George Washington* (SSBN-598) class. More recently, the attack submarine *Parche* (SSN-683) was converted in 1987-1991 to a deep-sea search/recovery submarine with the addition of a 100-foot section. The Soviet Navy also made major modifications to nuclear-powered submarines. For example, three of their early Polaris-type submarines of the Yankee (Project 667A) class were reconfigured as cruise-missile carriers with a new, elongated midships section inserted. These submarines each can carry some 40 of the SS-N-21 land-attack missiles, similar to the U.S. Tomahawk (the Russian designation for the missile is RKV-500 Granat).

Table 1: U.S. Attack Submarines, 1 January 1995

No.	*Class*	*Completed*	*Status*
SSN-637	Sturgeon	*1967–1975*	*24 active**
SSN-642	*Transport submarines*	*1965–1966*	*2 active*
SSN-671	Narwhal	*1969*	*1 active*
SSN-683	Parche *(special mission submarine)*	*1974*	*1 active*
SSN-688	Los Angeles	*1976–*	*56 active**
			6 building
SSN-21	Seawolf	*1996–*	*2 building*

**Some currently being deactivated*

The SSN-688 design can accommodate conversion because of its large size and powerful nuclear propulsion plant. The design, development, and production of three (or more) such conversions could provide Electric Boat with significant work pending the New Attack Submarine project and would provide the fleet with more capabilities in several combat areas than would one additional SSN. Although considerable funds already have been expended on components and systems for the third *Seawolf*, much of that material could be employed as spares for the first two *Seawolfs* and for training.

The conversion of three specialized submarines would require higher operating costs than a single *Seawolf*, but a case should be made to Congress that the Navy requires more than 45 to 55 attack submarines in the post-Cold War era, that the conversions will enhance naval capabilities for a relatively small investment, and—perhaps most significant—that the Navy can make use of the remaining service life of at least some of the excellent SSN-688s that otherwise would be discarded.

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[1] Ronald O'Rourke, "Navy Attack Submarine Programs: Issue for Congress," CRS Issue Brief (Washington, DC: Congressional Research Service, 17 January 1995), p. 3.

"What If . . ."

Our ship's safety officer was very diligent in his duties and enjoyed playing "what if" as a teaching method. While in our steering room chastising a young petty officer for not having the proper fire watch equipment while using a cutting torch, he asked, "What if these rags caught fire and you didn't have the extinguisher down here?'

"I'd go up the ladder and get one, sir," was the petty officer's reply.

"What if the ladder was blocked?" asked the safety officer.

"I'd use the escape trunk, sir," came the reply.

The safety officer was becoming annoyed at this point. "What if this space didn't have a damned escape trunk?"

"In that case, sir," the petty officer remarked, lighting the torch, "you'd better show me where you want one."

Randall L. Adkinson

Senator COHEN. Thank you very much, Mr. Polmar. The Cold War may be over, but what you gentlemen are suggesting is that we still have a Cold War adversary that we have to contend with and be prepared for, especially in the field of submarine technology.

Mr. POLMAR. But there is no threat of a nuclear attack or a large scale conventional war with Russia in the near-term.

Mr. BATTISTA. If I could sum it up very concisely, Mr. Chairman, I would say that Russian intent has changed, but in terms of submarines the capability is still there, and getting better.

Senator COHEN. That has always been the issue, has it not? We never could discern intent, but we always said it is capability that we have to be concerned about, not intent. We are not capable of looking into the mind of Gorbachev, Yeltsin, or any of their successors, and so it is always capability we must be concerned about.

Can you think of any example where we have overestimated Soviet capabilities in projecting when they were going to bring out a new generation of weapons systems?

Mr. POLMAR. Yes, sir. We estimated when new ICBM's would come on the line much earlier than they did, and the same thing with their manned bomber force in the 1950's.

Senator COHEN. How about any third generation submarine technology?

Mr. BATTISTA. I think historically in terms of submarines we have always under estimated.

Dr. WOOD. I cannot think of any exception to that.

One crucial point, Mr. Chairman, that follows up on what you said just a moment ago about remaining unchanged is Harold Brown's famous statement that "When we build, they build. When we stop building, they build." That describes the situation in a nutshell these days with respect to submarines and submarine technology.

Senator COHEN. I also remember Admiral Haywood's statements in the early 1980's. He kept talking about naval superiority, and that we were losing the margin, and it was a marginal superiority at best. If it came to a conflict, that the outcome would be murky. That was a statement that was made back, I think about 1980, or 1981, as I recall.

I would like to just say, for the record, that based upon my past service and current service on the Intelligence Committee, I tend to agree with what you gentlemen have said. We have consistently over the years under estimated the Russians' capabilities, especially in the field of intelligence activities.

Not to go into it here, but we have treated them, I think, with some condescension that was unwarranted. It is not limited to them, but I think specifically we have had an underestimation, and so I agree with your general consensus on that.

Mr. POLMAR. One other, if I may be presumptuous, perhaps, I would say there is one other interesting aspect of their submarine program which we have under estimated, and that is, they have competition in their design, and we do not have competition in the design of submarines. When we have underestimated them, it has been in areas such as that as well as the technology areas.

Mr. BATTISTA. Another key point, Mr. Chairman, you may recall I was literally the first American to set foot at Krasnayarsk, at the radar facility there.

Senator COHEN. I cannot recall, did you believe that was a radar tracking system at that time, or was it a Navy, an ABM system?

Mr. BATTISTA. It was part of an ABM system, that was my view.

Senator COHEN. A satellite tracking system.

Mr. BATTISTA. It was not satellite tracking. It was looking in the wrong direction. I also think it was a violation of the treaty at the time, and in terms of overestimating capability, I think we overestimated their missile silo hardness back then. It was nowhere near what we estimated it to be at the time.

We have made some overestimates, but certainly not in submarines, but I will say this. I met Afgeny Velikov after President Reagan's speech, and we debated the whole issue. In fact, Lowell, you were there in Sicily at the International Seminar on Nuclear War, talked to him there, became rather friendly with him.

There is one area that he would literally become rude with me on, and that was Soviet submarines. He would never talk to me about that.

Senator COHEN. Have any of you had any dealings with Andre Kakoshin?

Mr. BATTISTA. Yes. I dealt with Kakoshin. He accompanied me out to Krasnayarsk.

Senator COHEN. I will give you a copy of his speech. Senator Lieberman may be familiar with that statement he gave in Munich last February.

But we have got one more panel I want to get to, and just a couple of quick questions, Mr. Polmar. You talked about the unique scheme of active noise cancellation the Russians either had developed or were working on. We have no such comparable program in the United States. Is it because we do not seek to do that? What is the rationale?

Mr. POLMAR. As far as I know——

Senator COHEN. Do they have a better approach?

Mr. POLMAR. Their attitude was that once they decided they would make their submarines quiet, then that is what the Walkers gave them. Not technology, but knowledge of how noisy and how easy it was for us to detect them.

Once the decision was made they would go quiet, they went in several directions to go quieting, not just isolation of turbines, which has been our primary goal. They have gone for platform isolation, they have gone for active noise cancelling, they have gone for anechoic coatings, which not only reduce their vulnerability to incoming torpedoes, which is the original purpose of anechoic coating, but also to reduce internal noises.

If you look at their designs, they have kept double-hull submarines, which means that they have not just one surface outside of the pressure hull on which to use coatings, they have three surfaces outside of the pressure hull on which to use coatings.

So here again, they have not stolen our technology, but people like—not people like, but Walker has given them an idea of how vulnerable they were. Once they went after quieting, it was not, what is the best way we will do it, which was our approach in the

1950's to quieting, which we are still following, theirs was, how do you quiet seven different ways? Let us get them all involved.

Dr. WOOD. The fact that they are working on all of them, Mr. Chairman, is the thing which gives them the technological momentum which Dr. Foster and, I believe, all three of us consider to be so formidable.

They are proceeding down multiple technological axes simultaneously, and they are doing it through the present time. They are almost "doomed to win", because they are pursuing many tracks to superiority while we are going down only one, and we are going down it rather slowly.

The New Attack Submarine does have, if you will, "hooks" in it for the subsequent introduction of active quieting, if and when, but the Russians are already doing it. That is why the Russian and American curves of the new subcapability have intersected at such a sharp angle, and why, even in the near term, the outlook is so somber.

Mr. BATTISTA. Let me make one last point, Mr. Chairman, with regard to Secretary Douglass' assessment of technical, or technologically robust ability in this boat.

If you want to achieve hydrodynamic quieting, you need a space between the outer hull and the inner hull to which you can heat the air, and you can do that because 75 percent of our waste heat gets dumped overboard.

The Russians know what to do with that waste heat. That, in turn, gives you the ability to affect the boundary layer. That, in effect, gives you the ability to think about things like gas injection into that boundary layer. That, in turn, gives you the ability to control your vortices. That means speed. So when the Navy tells you going deeper does not really mean anything, they do not understand the phenomenology.

Penn State has done a lot of work in microbubble technology, for example, and you are not going to take this capability and backfit it into this New Attack Submarine. That is why you need the New Attack Submarine and you need something else, and you need both yards to do that.

If I could just conclude on one note, I do not know if Senator Warner was serious, but he said something about my position was the House position. Truly, I was on Skyline Drive riding my motor cycle and I made the mistake of carrying my cellular phone, and I get this phone call.

Senator COHEN. What kind of quiet motorcycle do you ride that you can hear a cellular phone ring? [Laughter.]

Mr. BATTISTA. It has automatic volume control. When you crack the throttle the radio comes up, too.

Senator COHEN. Is that Russian technology or Japanese?

Mr. POLMAR. We cannot discuss that in this session. [Laughter.]

Mr. BATTISTA. I started, I went up to see Congressman Hunter, and I have got to say, regardless of all the criticisms I have heard, he does not have a bit of submarine technology or production or manufacturing in San Diego. My assessment is he truly wanted to do what was right for this country, and what was right for the Navy.

You mentioned my consulting fee earlier. I will not take a consulting fee to work in this area, never have, nor will I ever, and frankly my career is winding down. I am going to retire—retire at the end of this year and paint cars for the rest of my life, do things I like to do, but none of us have any vested interest in this thing, so it is not that we are pushing something that is going to pay off.

The last point was on the mediocrity. Take a close look at the letter you got from the Under Secretary of Defense, and if you think you will ever see any of that technology that Secretary Douglass described earlier inserted in this platform, we may as well wait for the Great Pumpkin on Halloween.

There is no budget for that. It will never happen, and what you see right now is what you are going to get and what the submarine forces will be committed to for the next three or four decades, and that is why I say, when you get down to legislation, do not take anything for granted. If that is what you want, spell it out.

A contract among friends should not be offensive to anybody. If that is what the Department is going to do, then the legislation should not bother them one iota.

Dr. WOOD. Mr. Chairman, I am the only one here today that was on the panel that Les Aspin constituted with the very able staff support of Tony Battista back in the 1987–1989 time frame, on which a number of my distinguished senior colleagues also served, including Bill Perry and Paul Kaminski.

The assurances that the Navy is giving today with respect to the fixes that will be instituted, the institutional fixes that will be made with respect to better technology being developed, and better technology being inserted were the same ones given to that panel 8 years ago. Those promises, those assertions, those tenders of good future behavior were repeated in a hearing to the House Armed Services Committee the same day that we presented our unclassified report to that Committee.

Tony's point is not one which is a malignant forecast, or even an unhappy look back. It is simply a statement of history, and it is an assurance of history repeating itself. Unless these basic corrections are not only legislated, but unless the Congress revisits them frequently and, no disrespect intended at all, revisits them effectively, they simply will not happen.

They must be very clearly stated in bill language, and the Congress must come back again and again and see that the bill language is being implemented, in a fashion every bit as vigorous as Senator Warner was earlier today pursuing the issue of competition.

If that is not done, the fixes we advocate before you today will simply never happen.

Senator COHEN. Thank you, Dr. Wood.

Let me say, Mr. Battista, before I yield to Senator Lieberman, I hope you did not misconstrue my remarks about your consulting fees. When Senator Warner praised you as one of the most outstanding individuals that he had to contend with, I was simply saying that your stock is going up. I never suggested that you were making these recommendations in order to earn any fees for consulting.

Mr. BATTISTA. Oh, no, I just wanted to make it clear, I do not work for anyone, and Senator, may I ask, are you still on the Intelligence Committee?

Senator COHEN. Yes.

Mr. BATTISTA. I would be willing to come up and point you to the documents of the past that support, I think, many of the statements we made here today. We cannot discuss them in an open session, but NSA traffic and CIA assessments, things like that.

I think you know where they all are, but if you want to go back 10 or 12 years, I would be glad—I have got good corporate memory on that.

Senator COHEN. I think that would be helpful. I was going to suggest that one of the recommendations you made I think has some merit, and that is for this panel and some of your colleagues, perhaps, to sit down at a roundtable with some of the members who are on this committee with Navy participating, so that we can have the benefit of setting aside a day, if possible, to listen to the arguments. I think that the subject matter warrants that kind of examination on our part.

Mr. POLMAR. On a classified level.

Senator COHEN. Yes, a classified level, not an open session.

Senator Lieberman.

Senator LIEBERMAN. Thank you, Mr. Chairman, and thanks for inviting this panel. I suggested earlier, and I will say it with more intensity at this point having heard the testimony, that I think this is a panel of "friendly critics." Any program can stand that and that is the best kind of criticism to have.

In a sense, you are telling us that we are not doing enough, and, I am simplifying it a bit, but that is what I am hearing from you.

The interesting part is, as you probably know, with regard to the particular concerns that you have about Russian programs which motivate some of these suggestions you are making to us, the Navy trotted around this intelligence briefing about Russian programs, frankly just to try to get the support in the Senate to achieve the programs we have got here now, the third *Seawolf* and the New Attack Submarine.

I want to get back to that in a minute, because I think a lot of what we are talking about here is really that, in a sense, we are the problem.

I do not know if you would use the term common ownership.

Senator COHEN. Common conspiracy, I think it was. [Laughter.]

Dr. WOOD. I just said it was a commonly owned problem.

Senator LIEBERMAN. Before I get to that, this discussion has been very Russian-centered in terms of our work here. At some point there was a brief reference to China and India by somebody. Are there any other nations investing in submarine development at a level that should concern us?

Mr. POLMAR. The French, certainly.

Senator LIEBERMAN. That should concern us? Is that the qualification? [Laughter.]

Mr. POLMAR. It might, sir, in the context that everyone is selling everything today.

Senator LIEBERMAN. That is why it should concern us.

Mr. POLMAR. Again, if you want to buy a 180-knot Russian torpedo, that is available.

Mr. BATTISTA. Iran has been the benefactor of the Soviet program. I know in the past—I am not sure what has been declassified, but this technology, it has become a matter of economics, and I am really concerned about some of the windows of opportunity that we are missing with regard to taking Soviet scientists and literally draining them. I know other countries are doing it. I think some of this stuff is going to come back to haunt us.

Senator LIEBERMAN. That gets me to the basic point I want to clarify. Are we talking here about a failure to put adequate resources on the table behind submarine programs, and in that sense, a failure of political will or the ability to convince the public and, ultimately, our colleagues that we still face a serious threat? Not only do we still face a serious threat, but we face a more serious threat by your testimony, and by what Senator Cohen says, and what I understand based on intelligence briefings we have had.

Senator COHEN. It is not so much a question of money. It is a question of how you spend the money.

Senator LIEBERMAN. Is it a question of money? Are you not advocating truly that we spend more money than we have been able to squeeze out of Congress?

Mr. BATTISTA. I am advocating both putting more money into the submarine and antisubmarine warfare programs, and then providing legislative oversight to determine that that money is being spent for what is really needed.

Senator LIEBERMAN. But, for instance, when you hold up Secretary Kaminski's letter and you say you are concerned about whether we are ever going to see those technical insertions, a lot of that concern is because you worry that Congress is not going to actually give the money to make that happen. Am I right about that?

Mr. POLMAR. It is technical and bureaucratic. The existing submarine cannot take—the New Attack Submarine will not be able to take a lot of the technology that is out there, that is out there now. The structure we have for designing and developing submarines will prevent that.

Dr. WOOD. There is very little in the New Attack Submarine, Senator, that could not have been built a decade ago. It would have been an eye-poppingly-fine submarine if we were in the mid 1980's at the present time. But we are not. It is a decade later, and we have given the rest of the world a decade of free time, if you will. It is not so much that a great deal more money is needed. Yes, somewhat more is needed. But better focus and better direction of the funding is imperative.

In particular, it needs to go in the submarine technology, and in something that we have not discussed at all, there needs to be companion investment in antisubmarine warfare technology. Yes, the defense budget has dropped drastically since the mid-80's. But the amount spent in antisubmarine warfare is down by a factor of three in cost of constant value dollars.

The amount which should have been spent in submarine technology and tech base work has been deficient by at least a half-a-billion dollars per year for more than a decade. We have gone and built submarines, but we have not gathered the raw material from a technological standpoint to put into those submarines. When we find ourselves these days, for instance, facing KILO Class submarines sold by the Soviets all over the littoral areas of the Third World. We will soon be facing, as Norman has indicated, essentially 200-knot torpedoes in some of those submarines, and so forth. Those things are going to hurt us very badly.

Senator COHEN. If I could interrupt here, we have one more panel to go, and even though the Admiral is retired, I assume he is not so retiring that he does not have other plans to carry out this afternoon. If it is all right with you, I would like to go to the final panel.

Senator ROBB. Can I just ask one very brief question, if I could? I apologize. I was hosting the Foreign Minister from Korea and I could not remain for your initial remarks, but would it be fair to say that you have implicitly or explicitly suggested that we have an industrial base driven process that is not as sensitive to technology as it ought to be? Is that an oversimplification of what I picked up here at the end?

Mr. BATTISTA. You have an industrial base that is playing with 48 cards in the deck. They are not getting the benefit of all the Navy and other industry advances in technology and intelligence assessments.

Given the information that is available in the intelligence world and in the R&D community, Newport News and Electric Boat could do a sterling job in building you a submarine that the Russians would sit back and worry about for the next 3 decades as opposed to our worrying about them.

Let me say one final point on funding. Senator Lieberman is gone now, but I find it difficult to believe that we cannot find resources for an area as important as this. Then I look at the defense budget and I find several billion dollars in there for corporate information management systems, to automate the Pentagon's payroll and personnel system that is just absolutely wild, and I think they promised you $30 billion in savings about a year or 2 ago. I think you were quoted as saying where are they?

You know what? That is the best example of stealth in the world. Those savings do not exist. Yet they have got all of these diverse programs, and I just wonder when someone is going to take a look at the defense budget and say hey, let us prioritize here.

I realize we have got to automate the payroll personnel system, but you know what? This is important, too. If you go do some software house you can probably get that for a fraction of that cost.

Senator COHEN. Well, you are processing $3 billion in travel that costs about $1 billion just to process it, that is a waste of money.

Mr. BATTISTA. Exactly. Right.

Dr. WOOD. I think the basic thrust of your question, Senator, is where is the deficiency? The deficiency, I am afraid, is within the Government sector. The yards do every bit as well as, frankly, the DOD and the Navy bureaucracies permit them to do. The remedial action needs to be taken within the Government, primarily, if not exclusively.

Senator ROBB. Just one half a question: Is the cure to give the contractor more flexibility? It seems almost to be the precise opposite from what you just said in terms of nailing it down in terms of legislation, but is it to allow a creative and efficient private sector to do more with less constraint?

Mr. BATTISTA. Sure. Exactly.

Senator ROBB. But did you just say——

Mr. BATTISTA. No, no, no.

Senator ROBB. All right. That is what I want to clarify.

Mr. BATTISTA. No, I mean, you can legislate technologies and you can provide appropriation and authorization——

Senator ROBB. But we ought to be legislating a result, and not a path or means to get there.

Mr. BATTISTA. Exactly. The other problem you have is the money, frankly, is in the wrong place for technology. You have got a Defense Advanced Research Projects Agency right now that frankly is no longer the high-risk, high-payoff kind of activity that they used to be. My recommendation would be to put the technology money in the Navy, because that is where it belongs. I know it is personality driven, as well, but you have got a fine Secretary over there right now, and for as long as he is going to be there I think he can get a lot of things going. But DARPA does not even really want this stuff. You have got a real problem there, sir.

Mr. POLMAR. Put a submarine technology office in place today because of the kind of assistant Secretary you have, but put it in place to continue into the future.

Senator COHEN. I will make a deal with you, Mr. Battista. If you are as persuasive with Duncan Hunter in the House in persuading him not to request more B–2 bomber funding, we will see what we can do about getting more submarine prototypes. [Laughter.]

Thanks very much for your testimony. It was very helpful.

Our third and very patient and final witness this afternoon is Vice Admiral Baciocco, who is panel chairman. I want to thank you and the other members who served on your panel, Admiral, for performing a very valuable assessment of the Navy. We will insert your full statement in the record, and if you could, given the lateness of the hour and how long you have been waiting patiently for us, perhaps summarize what your panel found, talk about pros and the cons and what you discovered and what you are recommending.

STATEMENT OF THE SUBMARINE TECHNOLOGY ASSESSMENT PANEL, GIVEN BY VICE ADM. ALBERT J. BACIOCCO, JR., USN (RET)

Admiral BACIOCCO. Thank you, Mr. Chairman, for asking me here. It was 10 years ago that I was last here, and ironically we were here supporting the SSN–21, the Sea Wolf. Without reflecting on that, I was asked by the Department to put together a panel of an independent panel of experts to take a look at the New Attack Submarine and the New Attack Submarine technology program.

We did that. We examined the program, we examined the design, we examined the technology program, we reviewed and evaluated some 250 technology candidates which were submitted to the Navy in response to a December Navy solicitation, we met individually with each member of the panel of witnesses who preceded me, Mr. Battista, Mr. Polmar, Dr. Wood, as well as with Dr. Johnny Foster and Mr. Ron O'Rourke, who testified before the House National Security Subcommittee last September, to hear and to serious consider their perspective on submarines and ASW.

We found strengths and weaknesses, both in the submarine program and, indeed, in the technology program. We formulated some conclusions and recommendations. We identified several areas which we recommended by addressed by the Navy in future research and development endeavors. I will talk about those.

In the New Attack Submarine program, there were two noteworthy strengths that I would like to point out. One, the New Attack Submarine is as acoustically quiet as the Sea Wolf in a smaller hull, and has the capability to be quieted further, without changing that hull or the machinery arrangement or anything, through some of the mechanisms and technology that indeed is in hand today.

The New Attack Submarine incorporates some new higher performance systems which for our submarines are relatively new, no penetrating mass. I have been trying to do that for years. We finally succeeded. A very advanced DC electrical system which is innovative, and is the basis for growth and further quieting, indeed, in the future, and electromagnetic silencing, which we had not made an investment in in any submarine other than Sea Wolf before, and this has the capability of being closed loop.

In the submarine technology program a significant strength, indeed the result of investment over the previous decade or so, are a set of extensive facilities to mature and develop submarine technology, some of which has been addressed earlier today.

The weaknesses noted in the technology program led us to identify some vital serious needs necessary to assure the future vigor and success of the technology program. They include the need for a clear articulation of operational priorities and requirements, coupled with mission analysis, to create a common vision throughout the submarine force of the Navy to permit intelligent technology investments. We need a stable and adequate research and development funding continuum, which has not been the case, and, I might add, a continuum that involves both shipyards.

Parenthetically, we have talked about the Russians and how many they built, and the progress they have made. They have had five design bureaus working actively for my career of 34 years in the Navy driving submarines. They are bound to make progress. We basically have not. We have got to get back to that, and involve our shipyards intellectually—in an intellectual competition—and involved in the development of R&D.

Senator COHEN. What did you think of the Navy's proposal to have one yard designing and building subs and another yard designing and building carriers?

Admiral BACIOCCO. My personal opinion on that is it was the wrong thing to do, for the very reason I cite.

We also found a vital need for technology insertion strategy, which recognizes the diverse technology refreshment cycle to support backfits, current acquisitions, and future submarines, not just concentrating on the next submarine or the new construction submarine.

As I mentioned, there were six technology areas we felt were important. Indeed, technology areas that we felt were enablers to achieving the opportunity to get smaller, if you wish; more capable, if you wish; and cheaper submarines, if you wish. Those technologies are the following: hydrodynamics——

Senator COHEN. Has that been achieved, by the way, in the New Attack Submarine? Smaller, more capable, and cheaper?

Admiral BACIOCCO. The New Attack Submarine has used some design tools that are really impressive. They have a design process that is impressive. The Navy, which like any organization is a bureaucracy in the negative sense, has really stepped aside and passed far more to the original design shipbuilder, Electric Boat, than ever before, ranging from an involvement with the Navy. Well, first, a significant reduction in specifications and requirements, more performance specs than ever before, a couple of orders of magnitude below the Sea Wolf. That is significant. That saves money.

They have the design tools and they have the design teams that are made up of Navy, the customer in the case of Special Forces, the SEALs right there, as well as the shipbuilders, and now Newport News in there to achieve the design well.

Senator COHEN. Is it unrealistic what Mr. Polmar said, here is your nuclear power plant, now go design me a ship that will do the following things?

Admiral BACIOCCO. At the shipyard level I would say that there is risk in that. I will not throw that out the window. I will come back to that, and I will be delighted to discuss that in some detail.

I just want to make the point now that the process we have had on the New Attack Submarine is a good process, and it is a good balanced design. The emphasis on affordability, which the submarine force in the Navy had to put on it, does yield some shortfalls, because you look and you say these are my minimum performance thresholds. They meet the requirements, but then you do not—you say this meets it, I will take it, I will put it in, and you do not look at what you might put in if you had a million more dollars or $100,000 more dollars or you want a three more db performance. It does not mean the ship is incapable, but it does reduce your margin for increasing your ability to easily increase your performance should the mission or the threat change in the future.

I was on a first and a fundamental key area, hydrodynamics. There is reasonable evidence existing, and the panel found reasonable evidence, that several hydrodynamic concepts have been successfully combined by others, by the Russians, into an integrated advanced submarine design to improve overall performance. They have looked at this and designed it as a system. In our judgment, the concepts are not fully understood in the U.S., nor are they being applied by the Navy. We recommend establishing a robust and sustained hydrodynamics improvement program.

We understand polymers, we understand coatings, we understand heating, we understand suction, but we have always done research, and I am not talking about just the Navy, I am talking about the entire scientific community of the United States, and they are great and they are strong and they will pull us out of the problem if we give them the resources to do it, but they have addressed each one of these. They have looked at each one alone and said what does blowing do, what does suction do? It appears the other side has gone, or others have gone, and put these together and put them into a submarine as a system, and it is impressive, and we need to address that.

Second, an improved sail. The panel reviewed several alternative sail designs which would provide additional volume, for maintenance access, external stowage and mission flexibility, payload reconfigurability, if you will, as well as improved hydrodynamic performance, and it could potentially reduce target strength, acoustic, and radar cross-section. We recommend that potential enhancements be evaluated and an optimum sail design be selected.

Senator COHEN. So you can get more stowage and a lower profile?

Admiral BACIOCCO. Yes, sir, both of those. You could. Right now, it is a very tight sail. Right now your stores and gear for the SEALs, for instance, is stowed inside the ship, in this nine-man lockout chamber. It is very good, but I would rather be able to put some of that up above, and reclaim that real estate for other things. I would also like to be able perhaps to put my UUV's topside at sometime, or other equipment they might have.

Advanced fiber optics: The panel noted that the fiber optic sensor technology promises increases in performance and reductions in weight and volume and cost for both towed and hull arrays, and backfit of this technology is possible. We recommend an acceleration of the development of advanced arrays incorporating their fiber optic sensors.

Electric drive technology is available, and in our judgment could be developed into a submarine electric drive system in the fiscal year 2002 to fiscal year 2006 time frame. We recommend incorporation of electric drive into a submarine design as soon as feasible, while continuing to peruse more advanced electric drive technologies, including superconductivity, which when you achieve that you will have a tremendous impact on the size of the submarine.

Mission reconfigurability and external weapons: The submarine is designed to accommodate mission-specific modules today at new construction. Mission reconfigurability could also be achieved through the integration of external weapons within existing hull. We recommended that the Navy pursue external weapons as an enabler to facilitate mission reconfigurability, and as the submarine design evolves.

Finally, there is a wide variety of active control and sound-mounting concepts to reduce signature and reduce cost. We recommend that the Navy continue to pursue advanced active control techniques with vigor, and to incorporate into submarine systems as appropriate.

I have taken the liberty of providing our report recommendations in slide format to you. I will briefly go over those. They are to proceed with a new submarine, but commit strongly to continuous evolution of that submarine design; define a single product manager for all attack submarines to be responsible for acquisition, life cycle support, and ensuring the technology maturation and insertion into new submarines—this manager would be held accountable for, among other things; cosponsoring and participation in future oriented mission analyses which we do not think that the technology level is being done enough; conducting systems engineering, to identify needed future performance improvements and to evaluate clearly the worth of possible technological advances, which we do not think is being done enough.

Senator COHEN. I want to ask you a question with regards to your recommendation about having such a manager. What has been the history in the Navy or any other service in which there has not been manager turnover within a very short period of time so you have a good deal of managerial turbulence and no long-term personnel serving in that capacity?

Admiral BACIOCCO. Generally, the program is more costly, less smooth, the investments to support it are uneven, and it is never as good a program. There are some very good, in the Navy, models of this—SP, Special Projects Office. First, Red Rayburn, then Levering Smith, then Bob Wertheim, who I might add was a member of our panel, who I might add was also a member of the Aspin panel in 1988. They are life cycle managers. They worried about the current submarines, the future submarines, the past submarines, the development of the missile, the development of the missile system.

Interestingly enough, there was technical continuity that came up because Rayburn had as his deputy Levering Smith, who had as his chief engineer Bob Wertheim, and on down the line to the present time. That is a model. Certainly, Naval Reactors, NAVCOA, is a model, as well. The technical depth of that organization is awesome, it is very good, and it is irreplaceable. It is noteworthy also to see that the Levering Smith's of the world and the Admiral Rickover's of the world got along and coordinated very well without any problems and turned out some first-class leading edge submarines during the time that they were there.

The other thing this person should do is ensure that the shipyards are involved in everything. In other words, shipyards are more than building ways. The jewel in the shipyard, although I have built three myself on new construction crews, and there is nothing worse than a shipyard unless it is a shipyard at night in the rain. But the jewels of our submarine whole construction effort are the shipyards and the design capability that exists in those shipyards, the design potential.

I will tell you now they are not involved in future concept development and formulation. I think that is an unfortunate result of the emphasis on competition over time, and I think we can still compete, and we still should compete, but we also have to do what we can at the technology development level to foster an intellectual competition, and this advance the state of the art.

We further recommended that the Navy establish significant, stable, and continuing R&D programs under the product manager that supports and matures major advances, reflects technology base opportunities, and responds to future missions; that the Navy address the maturation—or this product manager address the maturation of technologies identified in our special topics, and I think Mr. Douglass, part of his program is to identify funds to address those six topics specifically as enablers. Finally, ensure that the tech-based community is involved with this and is responsive to this person.

In summary, Mr. Chairman, the panel concluded that there are no near-term technologies on the horizon which should preclude continuation of the new submarine as designed. The panel strongly encouraged the Navy to consider our recommendations regarding revolutionary technologies that should be pursued, the need for stability in R&D funding, and suggestions for improved management authority and accountability throughout the process.

I thank you for inviting me to comment on the Navy's program. I think I neglected and now would like to ask that my further remarks be put in the record. It is the study, and is there for your use, and information, and I am ready now to answer questions.

Senator COHEN. It will be included in full.

[The prepared statement of Vice Adm. Baciocco follows:]

PREPARED STATEMENT BY VICE ADM. ALBERT J. BACIOCCO, JR., USN (RET.)

Mr. Chairman, distinguished members of the subcommittee, thank you for inviting me to appear before you to discuss the Navy's submarine development and procurement programs as reflected in the Defense Authorization Request for Fiscal Year 1997 and the Future Years Defense Program. Most of my remarks will be focused on advanced technology for future submarine designs. As you know I recently chaired a Submarine Technology Assessment Panel. The bulk of my remarks will be a summary of that panel's 2 month study.

The panel was charged by the Assistant Secretary of the Navy for Research, Development, and Acquisition (and contractually sponsored by the Program Executive Officer, Submarines (PEO (SUB)) to provide an independent evaluation of available and future submarine technologies, as well as an assessment of the feasibility, cost, and potential benefits or drawbacks with respect to their incorporation into the new submarine platform. We were also tasked to recommend a technology insertion plan for submarines. We accomplished this task by examining the proposed Submarine Program and the supporting Technology Program.

The panel was comprised of fourteen members possessing strong technical and operational credentials and a depth of experience in Government, industry, and academe. A complete listing of panel members and their affiliations is found as Attachment A to this statement. Accompanying me today are VADM Daniel L. Cooper, Dr. David V. Burke, and Dr. Bruce Wald.

In December 1995, the Navy solicited papers on state-of-the-art technologies for our panel to evaluate. We met over a 2 month period, while we performed an ongoing evaluation of these responses. Meetings over the 2 month period were devoted to gaining an understanding of the projected threat, the Navy's new submarine program, the missions for which it was designed, and the technology resident in the baseline design. We also met with distinguished submarine designers and managers to understand lessons learned from the past. Current and former operational commanders were consulted in an effort to understand their perspective of present submarine operations and future needs. We met individually with each member of the subpanel that preceded me (Dr. Wood, Mr. Battista, and Mr. Polmar), as well as with Mr. Ron O'Rourke and Dr. John Foster who testified before the HNSC last September regarding submarine technology in order to consider their perspectives on this subject. Finally, the panel considered technologies presently in the Navy's new submarine design, those submitted in response to the December solicitation, those presented by the shipyards, and those technologies presently funded by the DOD and Navy technology community.

We found weaknesses, but also strengths in both the submarine program and the technology program. We evaluated technology candidate papers received from the December solicitation. Finally, we explored several special topic areas. From the findings in the submarine and technology programs, the technology candidate papers, and special topic areas, we derived conclusions and recommendations. I will now summarize the panel's findings, technology candidate evaluation, special topics, and conclusions and recommendations.

THE SUBMARINE PROGRAM

Strengths

The panel found several noteworthy strengths associated with the new submarine program. One was the ability to make the new submarine as acoustically quiet as *Seawolf*, but in a significantly smaller hull. This alone is no small technological feat and demonstrates a significant advance in quieting technology when compared with previous submarine classes. We found that the new submarine design incorporates new, higher performance systems. The elimination of penetrating masts, the change to an advanced DC electrical system, advanced Electronic Support Measures (ESM), and electromagnetic silencing are a few examples. The new submarine design also facilitates future mission reconfigurability. The design provides for insertion of mission specific hull sections during new construction. The panel noted that there is also flexibility inherent in the new submarine design as seen in the ability to reconfigure the torpedo room and the ability to changeout mast modules dockside.

One strength of the new submarine program was associated with the ability of the Navy to commit to the same shipyard for design and construction of the lead ship which allows the shipyard to commit to sub-tier vendors early, to incorporate producibility into the design early, and to work interactively with the Navy to produce a capable and affordable submarine. In addition, it was noteworthy that the Navy, in conjunction with both shipyards, achieved reductions in Government unique requirements and specifications.

The new submarine program has been focused primarily on affordability while meeting stated missions. The panel noted a balanced approach to submerged signature, the use of Modular Isolated Deck Structures, and design simplification through component reduction as design strengths. The panel also noted the combat system open architecture approach as a strength in the program. The use of Commercial Off-the-Shelf components in the Open System Architecture environment, along with contracted technology refresh updates should ensure that the combat system on the new submarine is the most capable combat system available.

Weaknesses

There also were weaknesses in the new submarine program. The emphasis on affordability precluded obtaining a higher performance multi-mission submarine, although, as I noted before, the desired operational performance levels will be attained with the current design. Affordability tradeoffs made early in the design resulted in performance tradeoffs which could limit the platform if radical changes occur in the threat or assigned mission. The result of these tradeoffs resulted in a design whose maximum speed, test depth, and firepower may not be as great as that exhibited, one feature at a time, in past designs, and whose signature may not be as low as the Navy can reach. The risk is that the design may not provide adequate performance margins as threats and missions evolve.

Another weakness that the panel noted was that the strategy for incorporation of future improvements is not clear. While the program noted there were plans for mission specific hull sections, preplanned product improvements, and technology insertion, the panel was unable to determine that these plans existed.

Through the review of the December solicitation papers, briefings from the shipbuilders, and discussions held with the DOD and Navy technical communities, the panel noted that the baseline design lacked certain desireable features which would probably be needed in the future and could still be incorporated into an early hull with vigorous action. These desired features could include an improved sail, a hybrid propulsor, and fiber optic towed arrays.

THE TECHNOLOGY PROGRAM

Strengths

One strength of the submarine technology program was the availability of capable and talented people to develop and mature submarine technologies. In addition, the panel noted that extensive capital investments have been made in facilities to support developing and maturing submarine technology. Several examples include:

Lake Pend O'Reille in Idaho which hosts large scale vehicles that can prove out hydrodynamic concerns and issues,

The Intermediate Scale Measurement System which provides unique and significant capability to evaluate signature components, and

The Hydrodynamic/hydroacoustic Technology Center located at the Naval Surface Warfare Center in Carderock Maryland which provides the modeling and simulation capability to explore hydrodynamic and hydroacoustic issues.

The Large Cavitation Channel located in Memphis, Tennessee which can support evaluation of propulsor and hull form hydrodynamic performance.

Weaknesses

The panel noted that critics of this design fear that the next Russian submarine will be operationally superior to the new submarine. While the panel cannot determine with certainty that the Navy has been overtaken or surpassed in particular areas, it is significant to note that there have been a instances in the past where the Navy has been surprised by Russian innovation and advances.

The panel noted that, historically, major technology development efforts have not had continuity and have been limited to the low risk options for the immediate submarine acquisition program. Funding for submarine technology can be classified as "spiky"—ramping up for the next specific acquisition program on the horizon and then rapidly falling off once the program has been formalized.

The panel noted that core submarine technology investments are generally too small to investigate important and/or revolutionary options in a timely manner. As a result, future modifications or new designs will be limited to evolutionary improvements over their predecessors.

We also found that the submarine requirements, acquisition, and technology communities lack both effective coordination and a common vision which would be expected to be documented in a formal long range plan. There is no single organization with technical authority and accountability across all aspects of submarine science and technology maturation and insertion.

The panel also found that the shipyards are not continuing principal players in submarine technology planning and development until well into the design process. The panel noted that other technology-dependent communities, such as the Air Force, rely to a great extent on industry for their technical base.

Finally, we noted that only limited funding is available to utilize the vast and capable infrastructure of test assets and vehicles that I mentioned previously.

TECHNOLOGY CANDIDATES

We performed a qualitative evaluation of the 257 December solicitation responses. Each response was reviewed by several panel members. Our evaluation of each candidate technology was based on the technology's military utility, schedule, cost, and risk with respect to the Navy's future submarine program. Technology candidates were categorized as possibly available in the near term (fiscal years 1998–2001), mid term (fiscal years 2002–2006), as well as far term (fiscal year 2006+). We categorized the papers into ten Congressional Interest Areas (documented in the fiscal year 1996 Defense Authorization Act) and eighteen additional topic areas (including acoustic sensors, non-acoustic sensors, precision navigation, acoustic signal processing, and regulatory compliance to name a few). From the Congressional Interest areas, the panel concluded that there were only seven technologies available in the near term (fisal years 1998–2001), if resources were applied at an accelerated pace. Of these seven technologies, none were deemed to have high military utility. Of the 55 near term technologies in the eighteen additional topic areas, only 18 were determined to have high military utility, but the majority of these were evaluated to have moderate to high cost and risk. From the technology candidate assessment, the panel proposed a technology insertion continuum based on the panel's interpretation of the maturity of technologies in areas such as quiet launchers, fiber optic sensors, and electric drive.

SPECIAL TOPICS

The panel identified six special technology areas which can promote arrangement flexibility and potentially reduce the volume of the submarine, while providing enhanced performance. The panel considered these technologies as enablers for achieving revolutionary change and advancement in submarine design. In addition, the panel identified leadership and management of both the submarine and technology programs as a special topic that the Navy should consider.

The first special technology topic area was *hydrodynamics*. Hydrodynamic concepts and technologies were identified to the panel which may significantly improve submarine stealth, speed, and maneuverability. Reasonable evidence exists that several hydrodynamic concepts have been successfully combined by others into integrated advance submarine designs to improve overall performance. These concepts are not fully understood in the US, nor are they being applied in the US Navy. Hydrodynamic technology opportunities, coupled with newly developed research tools and large scale testing facilities are available to conduct a vigorous hydrodynamics program to explore integrated approaches and to incorporate into submarines designs, as appropriate. The panel recommended that the Navy establish a robust hydrodynamics improvement program.

The second special topic area was *improved sail*. The panel was presented with several conceptual alternative sail designs which would provide additional volume for maintenance access, external stowage, and mission payload reconfigurability. Various geometries and materials were identified which could also provide improvements in hydrodynamic performance and reduced target strength. In addition, alternative sail geometries could provide space and surface area for embedded sensors and antennas in the long term. We recommended that potential enhancements be evaluated and an optimal alternative sail design be selected.

The third special technology topic area was *sensors*. The panel noted that fiber optic sensor technology promises increases in performance and reductions in weight, volume, and cost through applications of thin line arrays, billboard arrays, mine hunting sonars within the molded lines, and self monitoring. The panel noted that Commercial Off-the-Shelf electronics, open system architecture, and ease of installation make backfit of fiber optics reasonable. The panel noted that the program funding has been limited and recommended that development of advanced arrays incorporating fiber optic sensors be accelerated.

The fourth special technology topic area was *electric drive*. We found there are both internal and external electric drive concepts and technologies which may reduce radiated noise and provide more flexible machinery room space arrangements while significantly reducing ship volume and cost. Permanent magnet motor technology is available and could be developed into a submarine electric drive system in the fiscal year 2002–2006 timeframe. The panel recommended that the Navy explore the electric drive system, and, through a preplanned product improvement approach, incorporate electric drive technology into a submarine design.

The fifth special technology topic area was *mission reconfigurability and external weapons*. As noted in the submarine program findings, the submarine is designed to easily accommodate mission specific modules at new construction. One possibility for these mission specific modules would allow the submarine to carry an increased number of weapons. However, the panel noted that mission reconfigurability could be achieved through the inclusion of external weapons into the existing hull. The panel recommended that the Navy pursue external weapons as an enabler to improve mission reconfigurability as submarine designs evolve.

The sixth special technology topic areas was *active controls and mounts*. The technical community has a wide variety of active control and mount ideas to enhance mission capabilities and reduce cost. The panel recommended emphasis in this area.

The last special topic area was *technical leadership and management*. The panel noted that submarines are technology intensive, and therefore require a high degree of systems engineering and integration. As a result, technical leadership extending beyond the acquisition of a new design is necessary. The panel commented that this will be difficult during downsizing and in an environment that emphasizes acquisition skills. The panel noted that technical education is available and viable, but replacement, development, and mentoring of technical experts appear to be random. Continual development of leading edge technology and the unique attributes of submarines mandate development and retention of talented knowledgeable technical experts. The panel recommended that the Navy emphasize technical expertise and continuity in selection of key managerial positions.

CONCLUSIONS AND RECOMMENDATIONS

The panel determined that the new submarine, as presently designed, meets established requirements. The design provides a capable multi-mission submarine, with room and flexibility to incorporate some available and soon-to-be available technologies should they be required. We recommended that the Navy proceed with the new submarine, but commit to continuous evolution. In making this recommendation, the panel did not focus on considerations of budget, force structure, or industrial base. Instead, we relied on our finding that the design meets current requirements and has room for incorporating available and foreseeable technological advances, and there are no revolutionary advances on the near horizon which would justify delay.

The panel noted that the commitment to continuous evolution must include the formulation and maintenance of a technology insertion plan, including the consideration of technologies identified by the panel and others, for early technology maturation investments, as well as the periodic surveillance of potentially revolutionary technologies being explored in the technology base.

Although the new submarine design is appropriate, the panel noted that there are technologies which could be available in the far term and which may warrant a redesign of future submarines. We felt there were several areas that required stable and sustained programs in research and development to evolve these far term technologies. The Navy should program sufficient resources to investigate these technology areas including: hydrodynamics, improved sail, sensors, electric drive, mission reconfigurability and external weapons, and active controls and mounts. The panel strongly believes that these technologies will allow for arrangement flexibility and serve as enablers for revolutionary submarine designs of the future.

We concluded that the submarine R&D enterprise lacks prerequisites for an assured and viable future. A continuing, stable level of R&D funding, is especially critical. A better degree of stability in the R&D lines must be instituted, if longer term technologies are to be studied and matured, or eliminated, so that 10 years from now a similar panel will not see the technologies in the same undeveloped state. The R&D funding spikes have inhibited the insertion of state-of-the-art technology in current submarines and will prevent the maturation of advanced technology for future submarines. The Navy needs (1) substantial maturation investment early enough to meet the next design, (2) a refreshment strategy for current designs, and (3) a technology base developing options for future designs.

The panel also found mission analysis and systems engineering to be narrowly focused on the new submarine. Without future-oriented analysis and engineering, and better communication with technology base management, it is unlikely that the Navy will be investing technology base funds well. The panel concluded that a formal, published, continually updated long-range plan would be an effective coordination mechanism.

The panel concluded that separation of acquisition and life cycle support can inhibit the formulation and execution of cost-effective plans for technology maturation and insertion. In addition, we noted that some managers of the technology community seem to be so focused on early and visible transition of the work they sponsor, that they have lost the desire to support the high-risk, long-term efforts that could lead to revolutionary improvements in the performance of future submarines.

Based on our conclusions in this area, we recommended that the Navy define a single attack submarine product manager dedicated to acquisition and life-cycle support, including the maturation and insertion of technology into existing, newly designed, and future submarines. This product manager should have clear authority and accountability of the attack submarine product throughout its lifetime, plus continuing coordination responsibility with Naval Reactors . The panel recommends that, in addition to its acquisition responsibilities, the organization be held accountable for the performance of the future-oriented activities, including the formulation and maintenance of a long-range submarine technology plan.

SUMMARY

The panel concluded that there are no near term technologies on the horizon which should preclude continuation with the new submarine as designed. The panel strongly encouraged the Navy to consider our recommendations regarding revolutionary technologies that should be pursued, the need for stability in R&D funding, and suggestions for improved management authority and accountability. I thank you for inviting me to comment on the Navy's submarine development. I do hope that the Submarine Technology Assessment Panel's findings, conclusions, and recommendations on the state of advanced submarine technology have been helpful.

Senator COHEN. Thank you very much, Admiral. Let me ask you, do you have to be a retired admiral in order to make these kinds of recommendations, or can you do it from within the system?

Admiral BACIOCCO. I kid around that when one retires he gets instant wisdom. But it is far easier to step back and see what you are doing. The people in the Pentagon are working very hard, and they are doing everything they can to do it right. They have to deal with a lot of things. It is hard to deal with the future when you are cutting down the present, and your whole life which you have lived 30 years living and getting ready for, the whole paradigm has changed.

I think we do have people that think clearly. They do not have a lot of time to do so. They are well meaning. There are no nefarious schemes, as I think you know, going on in there.

Senator COHEN. Is there a problem in terms of trying to, quote, stretch the envelope conceptually? Do people progress within the Navy if they are seen as somehow challenging the system, for example those who say, "I have got a better idea, why are we building this new class of submarine when in fact we think that we can do it better, cheaper, faster, with more capability, than what we are currently doing, and here is a way to do it?" Can service members express these concerns, or is it more like we have a system: Here is how I progress, and here is how we get things done?

Admiral BACIOCCO. It is always healthy to have nonconformists, and in my career we had nonconformists.

Senator COHEN. How many reached admiral?

Admiral BACIOCCO. A few of us.

Senator WARNER. Even under Rickover?

Admiral BACIOCCO. Well, he was the first one. [Laughter.]

I found Admiral Rickover to be a very gentle man. I was scared to death of him until I got up to Command and understood what he was like, but the man had one absolutely dominant trait, and that is that he was brutally honest with himself and with you, and expected you to be with yourself and with him. That is a tough lesson to learn.

Senator COHEN. Well, we have someone in the audience right now who has written an extensive book on Admiral Rickover. Mr. Polmar is still here, and I think if you have seen his book or read his book it tells one a great deal about Admiral Rickover that perhaps one did not know.

Admiral BACIOCCO. I have not seen his book. I would be glad to receive an autographed copy. [Laughter.]

Senator COHEN. Could I ask you very quickly, you listened to some of the recommendations that the previous panel had made. Could you pick and choose among those recommendations which you favor and which you question? We had one, for example, conversion of the 688's rather than retiring them, we had another in regard to developing at least four or five operational prototypes, that would be instituted and funded in the parallel with what is going on with the *SeaWolf* program. Could you just talk about that for a moment?

Admiral BACIOCCO. Yes, sir. My submarine just went out of commission last Friday, the USS Gaydo, Captain Zeller, the OLA gentleman that is here was a skipper of that submarine. It was fortunate in that it had 28 years of great service. I hate to see submarines going out earlier than that. But it is the fiscal pressures on the system that have required that choice to be made when it comes to the time to refuel ships.

Senator COHEN. But the question really is should the Navy continue the 688 class in the inventory, go forward with the *SeaWolf*, and perhaps start the New Attack Submarine, and be looking to introduce additional capability.

Admiral BACIOCCO. If we built a ship we called an operational prototype, that is a full ship. I mean, it is going to be the ship we call the New Attack Submarine today. I mean, we build that, and we will wait until it goes to sea, and then we will fully shake it out. It is way down stream, and if we have not done it right we are going to have a lot of 688I's which are really very fine submarines, but they have really reached—they have filled up their margin.

Senator COHEN. They are projecting about an $8 billion for the four prototypes. Is that realistic, in your assessment, a billion and a half or two apiece?

Admiral BACIOCCO. I would say that is probably reasonable, and it is risked. Full-scale prototypes, quarter-scale prototypes, tenth-scale prototypes all have a place if you can build them quickly. You have to understand while you are building the prototype you are taking risk in a prototype. You want to see if something works culturally, mechanically, operationally, so it takes some time after you get it to do that.

The hydrodynamic side of the house, I think we can do on a quarter-scale prototype, and we have so recommended using Lake Pond Oreille and a large-scale vehicle. I would be very much in favor of building and committing to a large-scale vehicle hydrodynamic test vehicle prototype, and that should be scalable, and I think the shipyards could do that in a very short time relative to what it takes to build a full submarine.

Senator COHEN. Any area that you disagreed with the panel?

Admiral BACIOCCO. Yes, but I would say Mr. Battista's rundown of all the points he made, I had a hard time—I think there was one in which I disagreed, and that is in the area of nonacoustic ASW. What he says is right on the money. I think the Navy has put a lot of effort into understanding the signals and working on mitigating or understanding the risk in the detection of those signals. I do not think the Navy, perhaps because of their lack of investment in hydrodynamics, has done anything to eliminate systems on a submarine operated in a manner which would generate that signal.

I cannot say any more about that in this forum, but Tony hits the nail on the head. A lot of times when I sat on the other end of the hearing room from Toney it was not always pleasant, but our association has always been good and health and close.

Senator COHEN. Thank you very much, Admiral. I think Senator Robb is next.

Senator WARNER. May we say, Mr. Chairman, thank you very much for an excellent hearing today, very well programmed, and good panels.

Senator ROBB. Admiral, just a quick question, in terms of the R&D effort, program manager effort, whatever the case may be. My own experience with Admiral Rickover was more limited, but he did provide a single focus for an extended period of time without the problem of turnover and what have you. Is there a way, given the highly technical nature of this whole evolutionary process, that your panel either looked at that, or do you have any suggestions as to how to address that?

Admiral BACIOCCO. Yes, sir. We recommended—I think perhaps you had not come back into the room, but we recommended the definition or institutionalization of a single attack submarine product manager.

Senator ROBB. It was precisely that point I was referring to, and then Senator Cohen asked you the question as to what your experience had been with keeping an individual or—I am sorry, the question was asked what happens when there is turnover in that light, and that is really the question I was addressing.

Admiral **Baciocco**. I understand. If one did that, one would ensure that the system could handle turnovers. There should be a long duration for that manager. I do not recall how long Admiral Rayburn was in place in SP or Admiral Levering Smith was in place, or even Admiral Bob Wertheim. They were there a long time. But when they left and they retired their deputy moved up, and they had the technical expertise and experience in the attack submarine enterprise, using my model, right there.

They had been there all the time. They were a division head here and they were an engineering head over there. They move up and there is just not a ripple. I mean, they have worked with the yards, they have worked in the technology, they have influenced directly the technology development. They have indeed had a parallel responsibility to have a relationship and a close working relationship with Naval reactors, and it has been very successful.

I would propose that Mr. Douglass consider designating a project manager—right now, if I were doing it I would find some way to say PEO, Program Executive Officer, submarine, would probably be the logical place, and he would have an organization defined. Not necessarily reorganize the Department, but a set of authorities and accountabilities which are clear, and give him the control.

I agree with Tony, incidentally, DARPA has a place, and DARPA needs to play. But we cannot expect submarine money to go to DARPA and somehow find its way into the Navy. The Navy has got to do it, the Navy has got to be held accountable, and the Navy has to be able to devote and commit to devote, and the Department of Defense has to devote and commit to devote, a steady basis set of resources to submarines over the long period of time.

It has been sawtooth. We get ready for a new submarine, a lot of R&D, it goes to nothing, people go away, there is no continuity. We have got to change that.

Senator **Robb**. All right. I understand certainly the desirability of achieving that if we can.

One other question, and I was not here for most of the initial testimony of the panel that preceded you, but they did talk about some areas that they felt that the Russians had clearly advanced where we had not. Do you come to a similar conclusion with respect to where they are vis-a-vis where we are? Are there things that they have already done that we could borrow in much the same way they borrowed a lot of our initial nuclear technology? In other words, can we take advantage of their research in not having to go through all the hoops to get to the same spot?

Admiral **Baciocco**. I think that probably we are in a position to do so, yes, sir. The one thing that they seem to do, in my opinion, better than we have done, better than I did, is they view their systems as a system. They treat it as a system. They have a speed—so do we, to a degree. They do things for a reason, and understanding that reason is important. Sometimes it looks like we ought to chase them. Well, maybe the reason we are doing something is different than that, and we do not need quite as much speed or quite as much depth or quite as much this or that. But we do need as much quieting.

I think we have that chart that you showed with the flags on it—that you have seen with the flags on it, I do not like charts like that because the worst thing we ever did was to give—we invented power point and the ability to make graphics that are fancy. I like charts with numbers and the abscissa and the ordinate so I really understand the numbers. Those flags sort of overlap.

There is no question they have made tremendous progress.

Senator WARNER. Are still making it.

Admiral BACIOCCO. Absolutely, and are still making progress.

Senator WARNER. If the Senator would yield, we have got to get this across to the American public. They think because of Chechnya that the Russians cannot do anything in that foolhardy military exhibition against those people. But beneath the surface of the sea in a covert way, they are making enormous strides in all types of subsurface strategic programs.

Admiral BACIOCCO. Senator, their technology base exists by and large in a series of institutes across the country, every technology one could think of. There are a set of those that constitute the submarine technology base.

Our technology base, our parallel, our equivalent technology, exists in our universities and laboratories, if you will, and to a degree in our Government laboratories. It is important, in my personal judgment, the value of basic research, getting the best minds in the country to address a problem, and with Navy money sometimes, is important to settle these things that we do not understand. I think in these areas where they are doing things that we do not understand we should encourage, and I would expect the Navy to go out and find the best minds in the country to address that.

Senator WARNER. Senator, I do not want to eat your time away, but the Congress has got to keep some level funding for that program.

Admiral BACIOCCO. Absolutely right. Yes, sir.

Senator WARNER. As our staff director just pointed out, they tried this in the Navy. We failed to adequately fund it and keep it going.

Senator, did you have a further comment?

Senator ROBB. Just a comment. I understand the point. I would observe that in a pluralistic democratic market-driven society it may not be as easy to achieve as it is with a command economy with less opportunity for individual initiative, but beyond that, the point I certainly agree with, and I thank you for making it.

Mr. Chairman, I will yield.

Senator WARNER. Thank you very much, Senator.

Admiral, I had a chance to go back over your biography here. It is a very distinguished one.

Admiral BACIOCCO. Thank you, sir.

Senator WARNER. How pleased are we just as citizens that you continue to apply this background of knowledge to today's problems. I commend you for this, and the panel and its work. I would simply say you mentioned Levering Smith. What a wonderful man he was. I mean, that is the only word to describe him. He was beautiful, very soft spoken. Rickover, of course, quite a different personality, but he really was an extraordinary man. I admired him so much. Both of those fine persons.

In your estimation, is the Navy doing an adequate job in assessing submarine technology today? You have pretty well covered that, have you not?

Admiral BACIOCCO. I will say that I have briefed the results of our panel through the Navy, through the submarine community, through NAVSEA, through naval reactors, through Mr. Douglass and his associates, and Dr. Kaminski, as well, and Johnny Foster, and we have been uniformly well-received and endorsed. I think they will pay attention.

Senator WARNER. I hope to continue my service on this panel, but I would like to have you back next year or even sooner. This city, the walls are papered with the best intended reports in the world, but having gone through your report I think yours is an excellent one. The Navy would be well-advised to adhere to some of the points you raise.

Just out of curiosity, why do you feel the Russians are putting such a disproportionate amount of their money in subsurface strategic systems?

Admiral BACIOCCO. My parochial nature will show through on this, but I think the submarine, which is a highly complex and highly integrated system, is today, and will increasingly become, an essential part of national policy for any body. In the case of Iran, control of the Straits of Hormuz. In the case of the United States, the ability to have a strategic force to move forward quickly to be an unobtrusive point of the spear.

Senator WARNER. It is a force multiplier, is it not?

Admiral BACIOCCO. Yes, sir. The Russians understand that.

Senator WARNER. Given they have restricted assets, put the assets where you get the greatest multiplier in the value, and also where they cannot be seen, going largely undetected.

What is your explanation of China's desire to move forward in this area?

Admiral BACIOCCO. They appear to be aroused, and I think that they will look to what we have called the Pacific Rim with increasing embrace, and their navy apparently, as we have seen over the last several weeks, becomes a major part of that. That is of great concern.

Senator WARNER. Admiral, those of us who have been privileged to work for this great Navy of ours for a number of years in various capacities see things coming around again that we dealt with in years before. This year the President's budget has not CVN, but CVX—i.e., conventional power is an option for the next carrier. I happen to feel it should be nuclear, but nevertheless, perhaps it is time to study that from a cost perspective, from an operational perspective, from a threat perspective. Is it time for us to take a look at the conventionally-powered submarine?

Admiral BACIOCCO. As a part of the U.S. fleet, I think we have to be aware of the technology and stay close to it so we understand what that means to us, and perhaps indeed in certain cases for us. But our Navy will, into the foreseeable future, be a forward Navy, and having spent times in the front part of my career in diesel submarines, it is pretty miserable out there even if you do not have to snorkel, and we have to get where we have to go fast, we have to bring a lot with us, we have to stay there, and we have to be able to get back to replenish in 6 months or so. That is a nice model to have if you have to bring people back more frequently.

Senator WARNER. Any further questions, Senator Robb?

Senator ROBB. No, thank you, Mr. Chairman.

Senator WARNER. Thank you very much. The hearing is adjourned. We appreciate the participation of all witnesses.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR WILLIAM S. COHEN

SUBMARINE DEVELOPMENT

Senator COHEN. How much more budget funding will the Navy need to execute the new acquisition strategy for the years 1997 through 2001?

Secretary DOUGLASS. The Department has priced several alternatives that would lead to the competitive procurement of new attack submarines. These alternatives were outlined in the report submitted to Congress on March 26, 1996. Depending on the acquisition alternative, additional funding across fiscal year 1997–2001 would range from $2.4–$3.8 billion.

Senator COHEN. Please provide an analysis of the impact of adding two additional ships and a second shipyard on the current estimated unit cost of about $1.6 billion for the NSSN.

Mr. DOUGLASS. The Navy estimated the fifth ship cost at $1.55 billion (fiscal year 1995 $) based on lead ship authorization in fiscal year 1998, authorization of the second ship in fiscal year 2000, and the start of sustained, low rate production in fiscal year 2002 at Electric Boat Corporation.

The addition of a submarine in fiscal years 1999 and 2001 at Newport News Shipbuilding will cause unit cost to increase. The cause of this increase can be attributed to:

- Design transfer costs.
- Startup of the second shipyard. Newport News was last authorized a submarine in fiscal year 1990 and will incur startup costs to support construction of the New Attack Submarine.
- Learning curve effects. With production of thirty hulls split between two shipyards, unit cost will remain higher throughout the duration of the program because neither shipyard will realize as great a learning curve benefit as one shipyard would.
- Construction experience transfer. The construction of the lead ship in fiscal year 1998 at Electric Boat and the follow ship 1 year later at Newport News will limit the opportunity to gain beneficial construction experience from the lead ship before commencing construction of the second ship.

Competition is estimated to reduce total profit payments and production costs by pressuring both shipyards to keep labor and overhead rates down in addition to incentivizing greater production efficiency. However, it is unclear that the savings from competition will offset the above costs.

NUCLEAR ATTACK SUBMARINE PROGRAM

Senator COHEN. To what extent does the Navy believe it will be necessary to reallocate or reprogram funds from other Navy SCN programs or other Navy accounts to fund the increase in NSSN costs?

Admiral LOPEZ. The introduction of a second shipbuilder in fiscal year 1999 and competition outlined in the fiscal year 1996 National Defense Authorization Act calls for a higher building rate earlier than the Navy had planned for this program. It will be difficult to afford the plan directed by Congress in the context of other modernization priorities. Improvements in producibility and reductions in costs are critical to the affordability of the NSSN program. The need to reallocate funds within SCN to the NSSN, or from other Navy appropriations, is being addressed as part of the fiscal year 1998 budget development process.

Senator COHEN. To what extent and why will the award of an NSSN in 1999 and 2001 negate the savings attributed to lessons learned from prior attack submarine programs?

Mr. DOUGLASS. The award of a New Attack Submarine in fiscal year 1999 and 2001 will not negate the savings attributed to lessons learned from prior attack submarine programs. These lessons are being integrated into the New Attack Submarine program's Integrated Product and Process Development (IPPD) approach.

All New Attack Submarines will benefit from the lessons learned in prior submarine programs.

Senator COHEN. After the fourth ship is awarded, will future awards be based on a winner take all competition strategy or will the Navy revert to a similar allocation strategy as used in the DDG 51 destroyer program?

Mr. DOUGLASS. The DDG 51 program has benefited from competitive allocation. Much like the DDG 51 program, the Navy has been tasked to support long term competition between the only two shipbuilders capable of constructing nuclear attack submarines. As such, based on DDG 51 experience, the Navy may use a similar strategy for the New Attack Submarine.

Senator COHEN. What cost impact will the allocation strategy, if used, have on the unit cost of the NSSN?

Mr. DOUGLASS. As previously noted (see Question 2), the addition of a second shipbuilder splits the learning curve and increases unit cost. The cost impact on the New Attack Submarine program will depend on the competition strategy finally adopted.

Senator COHEN. How much of a premium will the Navy have to pay to keep two shipyards in the submarine construction business?

Mr. DOUGLASS. Compared to the program of record, reflected in the Department's fiscal year 1996 budget request, the Navy estimates that the addition of a second shipbuilder in the New Attack Submarine program, given the projected construction profile, could increase total program costs by approximately seven percent.

Senator COHEN. Beyond the fourth ship, what are the Navy's estimates of the total SCN dollars required to maintain its stated force structure of 45 to 55 submarines and its industrial base requirements?

Admiral LOPEZ. To maintain SSN force levels as the SSN 688 LOS ANGELES class submarines reach the end of their service life early in the next century, the Navy will need continuing sustained construction of 1.5 to 2 New Attack Submarines (NSSN) per year. Using the fifth ship of the class metric of $1.55B (BY 95$) equates to $2.3B–$3.1B SCN funding annually. If funding is provided to support SCN force levels, no separate funding would be needed to support the industrial base.

Senator COHEN. What percentage of the SCN budget does the Navy expect the NSSN program to require?

Admiral LOPEZ. Across the FYDP, the average annual percentage of the SCN budget required for one NSSN is 33 percent.

Senator COHEN. To what extent does the Navy believe it is possible to develop and produce a more capable submarine that will cost significantly less, about $1.2 billion, than the projected $1.6 billion for the New Attack Submarine?

Mr. DOUGLASS. The Navy does not believe that technology exists that would allow the production of a submarine more capable than the New Attack Submarine for $1.2 billion.

In response to the fiscal year 1996 House Appropriations Committee Report 104–208, the Secretary of the Navy reported that a cost goal of $1.2 billion would be unattainable without severely reducing the submarine's warfighting capabilities. The program has exhausted the measures available (e.g., requirements, technology, process, etc.) to reduce cost. Further substantial cost reduction is only possible by reducing ships capability. These cost reductions would result in an austere design that would lack requisite mission performance, versatility and flexibility for future upgrades, produce a submarine that is unable to adjust cost effectively to emerging operational requirements, and thereby undermine one of the key elements of the Navy's "Forward . . . From the Sea" strategy. A $1.2 billion cost goal is not attainable given the operational characteristics needed in the nation's next-generation nuclear attack submarines.

Senator COHEN. What is the Navy's assessment of the cost and schedule risk in terms of meeting delivery schedules of Government furnished equipment, such as the combat system, to the shipbuilders for the 1998 and 1999 submarines?

Mr. DOUGLASS. The Navy and shipbuilder have established individual risk assessment plans for each of the major components on the lead New Attack Submarine. With the exception of the combat system, the Navy and shipbuilder assess all other areas to have low schedule and cost risk. The Navy and shipbuilder assess the risk to the C^{3}I System to be moderate. Timely award of the C^{3}I prime contract is critical to support delivery of the hardware and software in November 2000 for lead ship integration and testing. Later delivery of the hardware and software will increase program risk by reducing the time available for C^{3}I System integration prior to loading into the ship.

Cost and schedule risks for all Government furnished equipment for the fiscal year 1999 submarine are considered to be low.

Senator COHEN. What is the Navy fall back position should the combat system not be developed in time for delivery to the builders of the first and second NSSN?

Mr. DOUGLASS. Current plans are to have the C^3I System integrated and tested at the C^3I System Off-Hull Assembly and Test Site (COATS). In the event the C^3I System is not available to meet current shipbuilder established delivery dates, hull and module construction could proceed on schedule and C^3I System components installed later in the construction cycle. C^3I System hardware components are being designed for installation in Structurally Integrated Enclosurea (SIEs). Installation of components in SIEs can be accomplished at the drawer, module or chassis level. These component assemblies can be installed in SIEs prior to the Command Control System Module (CCSM) end load into the hull cylinders or water-borne after completion of hull construction. In the event that the C^3I System was not expected to be delivered as currently scheduled, a contingency plan for rapid installation of the C^3I System after completion of the modular construction process would be required. There may be increased cost for integration and testing of the C^3I System in the event that the COATS was not used as part of the contingency plan.

Senator COHEN. What are the Navy plans to mitigate the risks of potential claims against the Government for the late delivery of the combat system or its components?

Mr. DOUGLASS. The NSSN program is being executed using the Integrated Product and Process Development (IPPD) concept. IPPD involves very close, cooperative program planning and execution between the Government and the contractor in a team environment. Government-industry multi-disciplinary teams jointly assess program risk and identify appropriate risk mitigation actions. Government Furnished Information delivery dates were mutually agreed to by the Navy and the shipbuilder prior to inclusion in the shipbuilder's IPPD96 design contract and the same process will be used on Government Furnished Equipment delivery dates prior to award of the fiscal year 1998 lead ship construction contract.

Risk mitigation planning includes: the use of Structurally Integrated Enclosures (SIES) to bound the interface between the ship and the electronics in order to minimize shipbuilder redesign and rework in the event of system design changes; the use of Navy standard computing and display resources such as the AN/UYQ–70 Advanced Display System to allow for early definition of critical system components; and the use of associate contractor agreements between the C^3I System prime contractor and the shipbuilder to enhance schedule performance.

Senator COHEN. What are the costs for systems such as the Light Weight Wide Aperture Array, that are under development and are not included in the cost of the combat system?

Mr. DOUGLASS. The development cost for the Light Weight Wide Aperture Array (LWWAA) is included in the NSSN C^3I System development cost. The fiscal year 1997 President's Budget and associated FYDP includes $54.2M across fiscal years 1997–2001 for LWWAA development.

Submarine research and development programs are developing systems which have applicability on NSSN and other operational submarines. For these programs, the NSSN C^3I System cost reflects unique costs for integration and development.

Senator COHEN. What is the total cost of the combat system?

Mr. DOUGLASS. The total cost of the NSSN C^3I System includes the costs for 15 subsystems. These subsystems are Combat Control, Sonar, Architecture, Imaging, Electronic Warfare Support Measures, Exterior Communications, Navigation Sensor System Interface, Navigation, Tactical Support Devices, Submarine Defensive Warfare System, Radar, Non-Tactical Data Processing, Interior Communications, Total Ship Monitoring and Special Purpose.

Recurring shipset procurement and installation cost for the C^3I System is $288.4M (Then year fiscal year 1998 dollars).

Non-recurring development cost for the C^3I System is $749.4M (total across fiscal years 1994 through 2001).

QUESTION SUBMITTED BY SENATOR JOHN W. WARNER

NUCLEAR ATTACK SUBMARINE PROGRAM

Senator WARNER. You have said that the Navy is committed to a fiscal year 1999 submarine. Are you committed to funding it in the budget?

Admiral LOPEZ. The Navy's commitment to the construction of a New Attack Submarine at Newport News in fiscal year 1999 is evidenced in the following recent actions:

— obligating $10 million from fiscal year 1996 RDT&E,N funding for New Attack Submarine design related rework at Newport News;
— initiating design transfer actions with about $9 million from fiscal year 1996 SCN;
— procuring the first increment of long lead components to support building a fiscal year submarine at Newport News, and
— programming $35 million in fiscal year 1997 to continue the design transfer to Newport News.

However, the introduction of a second shipbuilder and long term competition require a higher building rate earlier than the Navy had planned for in this program. It will be difficult for the Navy to fund the submarine construction plan required by the fiscal year 1996 National Defense Authorization Act in the context of other modernization priorities.

QUESTIONS SUBMITTED BY SENATOR JOHN MCCAIN

STATUS OF *SEAWOLF* COST CAP

Senator MCCAIN. Secretary Douglass, last year, Congress revised its existing cost cap on the *Seawolf* submarine procurement program to include the SSN 23. The amount which the Navy is authorized to spend on the three *Seawolf* submarines is $7.224 billion.

What amount is allocated within the cap for each of the three submarines?

Mr. DOUGLASS. The amount allocated within the cost cap for each ship is as follows:

SSN 21–$2.5B
SSN 22–$2.3B
SSN 23–$2.4B

Senator MCCAIN. What are the prospects that the Navy will require more than $7.223 billion to complete all three submarines?

Mr. DOUGLASS. The program is executing within the cost cap. The Navy is committed to remaining within the cost cap.

Senator MCCAIN. What are the aspects of the program that are most vulnerable to cost increases and why?

Mr. DOUGLASS. As with any lead ship of a new class, technical problems can arise while undergoing ship and component testing and qualification. Also, the contractor's deteriorating business base and overall declining workload will continue to pose a challenge to managing the ship construction within the cost cap.

Senator MCCAIN. What is the Navy's opinion of the utility of this legislated cost cap on restraining cost growth in the *Seawolf* program? Would the Navy have instituted its new management approach to the *Seawolf* program without the mandated cost cap?

Mr. DOUGLASS. The fundamental decisions which determined the programs ultimate cost were made many years before the imposition of the cost cap. The cost cap has focused Navy management attention on cost execution during the final years of program execution.

INFLATION REDUCTIONS IN THE *SEAWOLF* PROGRAM

Senator MCCAIN. Secretary Douglass, early this year, the administration announced lower inflation estimates, which resulted in excess funds in the Department of Defense. There is some question as to how DOD allocated reductions for lower-than-anticipated inflation against individual programs. For example, we have been told that some programs have been protected from inflation reductions, and others have been reduced more than the percentage adjustment indicated by the inflation reduction.

What amount has been reduced from the *Seawolf* program for re-estimated inflation?

Mr. DOUGLASS. All appropriations for the *Seawolf* program were reduced because of OSD's inflation estimates. The inflation reductions taken from fiscal year 1996 through fiscal year 2001 are as follows:

SCN—$7.831M
RDT&E—$6.138M
OPN—$7.062M
OM&N—$2.025M

Senator MCCAIN. Is this the correct amount to reflect the actual percentage change in anticipated inflation? If not, what is the correct amount?

Mr. DOUGLASS. The *Seawolf* program adjusts inflation rates as directed to reflect current OSD inflation estimates. Actual inflation at the shipyards, however, could exceed current OSD inflation estimates. It is important to remember that actual inflation rates vary from industrial sector to sector. The composite rates used by the DOD unfortunately do not reflect this reality.

Senator MCCAIN. Does the FYDP include sufficient funding to complete the *Seawolf* program?

Mr. DOUGLASS. Yes, although the fiscal year 1998 funding is required for completion.

STRETCH OUT OF *SEAWOLF* FUNDING

Senator MCCAIN. Secretary Dalton, last year, the Congress decided to fund the third *Seawolf* in two annual increments, appropriating about $700 million last year with the expectation that the Navy would include the required second increment of $800 million in the fiscal year 1997 budget request. I should note that I oppose incremental funding of procurement programs because of the instability potentially created within programs and the possibility that programs once begun may not be completed because of lack of funding in future years.

Would you care to comment on that observation?

Mr. DOUGLASS. Incremental funding provides a higher programmatic risk of increased costs and termination liability and subjects the program to potential budget cuts which increases the risk of not obtaining complete program funding. Budgetary constraints in the Future Years Defense Program and incremental funding of SSN 23 in fiscal year 1996 by the Congress resulted in the decision to incrementally fund SSN 23 in fiscal years 1997 and 1998.

Senator MCCAIN. I note that the Navy chose to further stretch out the procurement request by asking for only $700 million in fiscal year 1997 and another $100 million in fiscal year 1998.

What is the impact of this stretchout on the program?

Mr. DOUGLASS. Stretching out funding for SSN 23 affects program stability and puts the funding needed to complete the ship at risk for an additional year. Incrementally funding the *Seawolf* program also could increase costs as the shipbuilder and suppliers cover higher risks during execution of this complex shipbuilding program.

Senator MCCAIN. Why did the Navy choose to split the funding into 2 years?

Mr. DOUGLASS. The remaining funding for SSN 23 was split between fiscal year 1997 and 1998 as a trade off to provide funding for other high priority Department programs.

Senator MCCAIN. What is the Navy's view of incremental funding of ship procurement in general?

Mr. DOUGLASS. The Navy fully supports the Department of Defense policy for full funding of procurement programs. Incremental funding provides a higher programmatic risk of increased costs and termination liability and subjects the program to potential budget cuts which increases the risk of not obtaining complete program funding.

SEAWOLF PROGRAM COST

Senator MCCAIN. Secretary Douglass, last year, the Navy provided a figure of approximately $12.9 Billion as the total program cost of the *Seawolf* Program.

Is this figure still accurate?

Mr. DOUGLASS. The December 1994 and 1995 Selected Acquisition Reports for the SSN 21 Class/BSY–2 reflected a total program cost of $13.1 Billion.

Senator MCCAIN. Have there been any increases in program costs outside of the legislated cost cap from the estimates provided last year that total to $12.9 billion? If so, please provide detailed information.

Mr. DOUGLASS. The December 1993 Selected Acquisition Report (SAR) for the SSN 21 Class/BSY–2 reported a total program cost of $12.9 billion. The December 1994 and 1995 SARs reported a total program cost of $13.1. The change was due to increases in program costs outside of the legislated cost cap as follows:

Item	Change (then year $M)
(1) RDT&E	
Revised escalation indices	−3.1
Adjustment for current and prior inflation	+1.5
Refined cost estimates for SSN 21 and BSY–2	+22.6
RDT&E Subtotal	+21.0
(2) Procurement	
Revised escalation indices	+36.3
Revised Outfitting and Post Delivery requirements	+14.3
Revised OPN costs	+126.2
Procurement Subtotal	+176.8
(3) MILCON	
Deletion of requirement for Project 008 for BSY–2	−1.2
TOTAL	+196.6

SEAWOLF DELIVERY SCHEDULE

Senator MCCAIN. Secretary Douglass, I understand there may be some slippage in the delivery schedule for the *Seawolf* submarines. Last year, we were told the first submarine would be delivered in May 1996, the second in June 1998, and the third in May 2002.

What is the current planned delivery date for each of the submarines?

Mr. DOUGLASS. The delivery dates for SSN 22 and SSN 23 have not changed. SSN 21 delivery is planned for the Fall of 1996.

Senator MCCAIN. If the schedule has slipped, please explain why and provide revised delivery dates.

Mr. DOUGLASS. Delivery dates for SSN 21 are dependent on completion of testing and integration that is required for the ship to safely go to sea. With the imposition of the cost cap, the schedule must be flexible so the most cost effective approach can be used to complete the ship. As a result, a change in the delivery date is not expected to increase the cost of the ship. The delivery of the SSN 21 has changed from Spring 1996 to Fall 1996. The SSN 22 and SSN 23 delivery dates have not changed.

Senator MCCAIN. What is the impact of this slippage on program cost?

Mr. DOUGLASS. The change in the delivery date is not expected to increase the cost of the ship.

NEW ATTACK SUBMARINE (N–SSN)

After spending nearly $13 billion on three *Seawolf* submarines, the Navy is now pursuing a follow-on attack submarine program, call the New Attack Submarine, or N–SSN. Current estimates are that this 30-submarine program will cost about $60 billion, or $2 billion per submarine. Granted, this is less than half the $4.3 billion cost of each *Seawolf* submarine. But I have some concerns about this follow-on program.

COST OF THE NEW ATTACK SUBMARINE

Senator MCCAIN. Secretary Douglass, to date, the Congress has authorized and appropriated $2.1 billion for the NAS program, including long-lead for the first submarine. By the time the first NAS submarine is authorized in fiscal year 1998, more than $6 billion will have been provided for this single program. By the time the second submarine is authorized in fiscal year 2000, another $3 billion will have been dedicated to the NAS program, for a total of more than $9 billion.

I should note that Dr. Wood and Mr. Battista, scheduled to appear in our second panel today, have also raised the issue of the exorbitant cost of U.S. submarines

Are these amounts correct?

Mr. DOUGLASS. The total amount referred to, which includes both RDT&E and SCN costs, reflects both the recurring costs for the first two ships (about $2 billion per ship) and the non-recurring costs associated with the design.

The fiscal year 1996 National Defense Authorization Act directs a New Attack Submarine to a second shipbuilder in fiscal year 1999. The cost of this ship is not included in the President's fiscal year 1997 Budget request, which reflects the program of record. The additional cost required for a fiscal year 1999 ship at Newport News is reflected above core, as allowed for by the Act.

Senator McCain. Is $60 billion the current estimate for a 30 submarine NAS program?

Mr. Douglass. As reported in the December 1995 Selected Acquisition Report for the New Attack Submarine, the estimated total acquisition cost for the program of record is $64.9 billion (then year dollars).

Senator McCain. How does that break down among development, procurement and other costs such as outfitting and basing?

Mr. Douglass. Of the $64.9 billion estimated for the total program acquisition costs, $3.7 billion is for Research, Development, Test and Evaluation. The remaining $61.2 billion is broken down into ship construction costs ($58.9 billion), outfitting ($1.6 billion), post delivery ($0.6 billion) and trainers and initial shore supply support ($0.1 billion).

EARLY TERMINATION OF THE NEW ATTACK SUBMARINE PROGRAM

Senator McCain. Secretary Douglass, one concern I have about the NAS program is based on our experience with the *Seawolf* program. When we truncated the *Seawolf* program at only three submarines, the sunk costs and termination costs resulted in the expenditure of nearly $13 billion for three submarines.

If, by the turn of the century, fiscal constraints make it impossible to continue to devote several billions of dollars every other year to procuring one or two New Attack Submarines, we will be faced with sunk costs of at least $9 billion for two submarines, or $4.5 billion for each NAS submarine.

What are the estimated potential termination costs of truncating the NAS program after the second submarine?

Mr. Douglass. The New Attack Submarine was designed as an affordable alternative to *Seawolf*. The Navy recognized from the outset of the New Attack Submarine Program that the payback period for one time design costs would be about 6 or 7 ships when compared to continuing to build *Seawolf* class SSNS. Therefore, it would not make sense to terminate the program early. Moreover, without continuous low rate production, beginning this decade, many nuclear and non-nuclear component suppliers will go out of business and the talent, skills and discipline to design, build, test and integrate these components will be lost. Many suppliers would attempt to attribute all of their going out of business costs to the termination order making any estimate of termination costs highly speculative and settlement of these costs would likely be time consuming and litigious.

If we stop building submarines, the capability to, design and build nuclear powered submarines will atrophy. Reconstituting a nuclear capability would be time consuming and costly, assuming that it could be done at all. In addition, terminating New Attack Submarine construction and then restarting even a short time later would create a situation where required submarine force levels could only be maintained with high rate construction, 3–4 submarines per year—clearly not affordable in the foreseeable future, especially because there would be one time costs of several billion dollars to design another new class of submarines. The Navy program to start construction of the New Attack Submarine program with an affordable design and then improve the design through pre-planned technology insertion will provide the Navy with a submarine force that is affordable and constantly improving and will sustain the nations capability to both design and build submarines.

LIFE CYCLE COSTS OF THE NEW ATTACK SUBMARINE PROGRAM

Senator McCain. Secretary Douglass, the $13 billion spent to procure three *Seawolf* submarines does not include anticipated operation and maintenance costs for these submarines.

Does the $60 billion program estimate for the NAS include lifecycle costs?

Mr. Douglass. No. The $64.9 billion (then year dollars) estimate is acquisition cost.

Senator McCain. If not, what are the life cycle costs for the NAS program? What are the operating and maintenance costs for each NAS submarine? What is the expected service life of each submarine?

Mr. Douglass. Total life cycle costs for the New Attack Submarine Program are estimated to be $33 billion (fiscal year 1995 Constant Dollars) for all direct and indirect operations and support costs and disposal costs. The operating and maintenance (support) costs for each New Attack Submarine are estimated to be $7.5 million (fiscal year 1995 Constant Dollars), which is less than the annual costs for either a SSN 688I or *Seawolf*. The expected service life of each New Attack Submarine is 33 years.

MAINTAINING THE INDUSTRIAL BASE

Senator McCain. An option designed to help maintain the submarine industrial base instead of starting to build a whole new class of submarines is to upgrade some of the existing Los Angeles class submarines. As a result of overall submarine force drawdown, several of these submarines are being decommissioned—some with up to 14 years of service life remaining, just past the halfway point in their expected service life. I believe this is extremely inefficient and the taxpayers deserve better than this use of their money and the defense budget. If we were to overhaul and upgrade these submarines to keep the industrial base alive, we would not have to rush the design of the New Attack Submarine.

Why are you opposed to this idea?

Mr. Douglass. The Navy is inactivating only those SSN 688s not needed to maintain the force level. Refueling the small number of early SSN 688s planned for inactivation would neither sustain state-of-the-art technology for submarine design and construction nor meet military requirements for advanced submarines. Further, refueling those SSN 688s planned for inactivation would not change the number of new SSNs which must be built to meet SSN force level requirements in the next century. In addition, SSN 688s have little or no margin for further upgrades. Overhaul/upgrade of these ships would result in only limited performance enhancements and mission area extension is beyond reach. Fundamental ship characteristics, such as stealth (vulnerability to high performance threats), or weapons payload, cannot be changed through the overhaul approach.

Submarine overhauls do not require the same type or magnitude of design effort associated with new submarine development. Similarly, overhauls do not require and, therefore, do not preserve the mix of construction skills demanded by new submarine construction. Further, overhauls do not provide much work for nuclear and non-nuclear major component suppliers. Without new submarine construction, many nuclear and non-nuclear component suppliers will go out of business and the talent, skills and discipline to design, build, test and integrate these components will be lost. If we stop building submarines, the capability to design and build nuclear powered submarines will atrophy. Reconstituting a nuclear capability would be time consuming and costly, assuming it could be done at all.

Senator McCain. How much would it cost to overhaul and upgrade these submarines? What would be the cost savings realized by an upgrade program rather than the NAS procurement program?

Mr. Douglass. There would be no savings if the Navy were to maintain the existing SSN 688 fleet rather than retiring those ships not needed for force level requirements. Retaining these ships would cost the Navy an additional approximately $4.5B in refueling overhaul costs, direct operating and support costs and indirect support costs. The Navy would still need to build the same number of NSSNs as currently planned to maintain out year force levels without resorting to unrealistically high procurement rates.

MAINTAINING CURRENT ATTACK SUBMARINES

Senator McCain. The Navy currently plans to retire a number of SSN 688 class submarines at half-life to ensure that the planned *Seawolf* and NAS submarines can fit within the Bottom-Up Review force levels of 45–55 attack submarines.

Are the 688s capable and effective submarines?

Admiral Lopez. The Navy's submarine force remains the premier submarine force in the world, and the *Los Angeles* (SSN 688) class is the backbone of our force. However, the SSN 688 class submarine is basically a 30 year old design, has exhausted space and weight margins, is at its limit for system improvements, and is becoming increasingly vulnerable to detection.

The keys to success against a quiet diesel or nuclear submarine are acoustic quieting, effective and capable sensors and processors, weapon system performance, and crew proficiency. For the first time since *Nautilus* put to sea, the United States no longer has as clear of an acoustic advantage. Today there are Russian submarines at sea and under construction that are as quiet, at low speeds, as our improved 688 class submarines. However, U. S. submarine crews remain the best trained in the world, and our submarines are equipped with the most advanced homing torpedoes and superior sensor and processing technology. Combined, these factors help offset the reduced acoustic advantage. The margin of U.S. submarine superiority is, however, smaller than ever before.

Senator McCain. What are the costs to maintain them?

Admiral Lopez. The average annualized direct operational and maintenance cost for a *Los Angeles* (SSN 688) Class ship is $8.0 million with additional manpower funding of $5.3 million. Additionally, the first group of ships in this class require a refueling overhaul at the 16 to 20 year point of service life. The exact cost for a refueling overhaul varies depending on the scope of the overhaul work package and the shipyard conducting the work. On average, a refueling overhaul for a SSN 688 Class ship costs approximately $265 million.

Senator McCAIN. If additional funds were available for refueling and maintenance, would you want to keep these submarines in the fleet?

Admiral LOPEZ. The Navy plans to operate the number of 688 Class SSNs which are dictated by operational requirements. The Navy force level requirements have been established at about 55 SSNs by the end of 1999.

Operating all SSN 688 class submarines until the end of their life incurs not only the cost of overhaul but also the post-overhaul annual operating costs. The Navy plan is designed to take advantage of the savings obtained through early inactivations of those SSN 688s which are not needed to maintain the SSN force level. The New Attack Submarine represents a significant advancement in SSN capability, and meets the quieting requirements delineated by the JCS. Delaying retirement of selected 688s is a more expensive alternative in the long term, and would result in a larger, but less capable force.

OTHER UNFUNDED NAVY REQUIREMENTS—MINE WARFARE

Senator McCAIN. Vice Admiral Lopez, in his prepared statement, Dr. Lowell Wood expressed concern about the narrow focus of the Navy in its submarine programs to the exclusion of other Navy warfighting capabilities.

Are the Navy's resources for mine detection and mine warfare adequate?

Admiral LOPEZ. The Navy's resources for mine detection and mine warfare are adequate. This year we adopted concept based requirements in our mine warfare programs. These are detailed in the Third Edition of the U.S. Naval Mine Warfare Plan submitted to Congress on March 26, 1996. To provide metrics for the execution of this mine warfare plan, A Mine Warfare Campaign Plan has been developed consisting of three parts: The Near Term, Mid Term and Far Term. The Near Term Campaign Plan covers fiscal years 1996 and 1997. The Mid Term Plan spans fiscal years 1998–2003. The Far Term covers the years beyond the FYDP.

The Near Term Campaign Plan is fully funded by the Navy.

The foundation for the Mid-term Campaign Plan funding is contained in the FYDP. Although not yet complete, the Navy maintains strong commitment in the fiscal year 1998 budget development process for those programs supported in the Near Term Campaign Plan and for the readiness and sustainability of our mine warfare forces. The Mid Term Campaign Plan will be fully funded.

The Far Term Campaign Plan focuses promising technologies that will allow for rapid mine identification and neutralization by organic Naval Forces. Offboard remote autonomous systems will also allow for standoff mine reconnaissance and clearance of the surf zone and the craft landing zone. As these promising technologies mature, they will be transitioned to the fleet. The Far Term Campaign Plan will also be fully funded.

OTHER UNFUNDED NAVY REQUIREMENTS—NON-SUBMARINE BASED ASW PROGRAMS

Senator McCAIN. Are the Navy's non-submarine based ASW programs fully funded?

Admiral LOPEZ. Other naval aviation priorities and fiscal constraints have precluded the ability to fund some air ASW program requirements for the 600-aircraft air ASW force, comprised of the P–3C, S–3B and SH6OB/F. RDT&E,N funding constraints have delayed development/procurement of new technology air ASW sensors, including SSQ–101 Air Deployable Active Receiver (ADAR), replacement for the SSQ–77B Vertical Line Array Difar (VLAD), the Shallow Water ASW Localization and Attack System SWALAS) and the Generic Acoustic Stimulation System (GASS).

The current sonobuoy inventory consists primarily of those sonobuoys which are optimized for deep water ASW operations, hence the requirement exists to modify the current inventory to enable shallow water/littoral operations. However, OPN constraints have delayed optimization of the sonobuoy inventory for shallow water.

The key to air ASW platform capability is the integration of digital acoustic processors required to control and process new ASW sensors and sonobuoys. Of the 238-aircraft P–3C force, 140 aircraft are currently configured with the Update III digital acoustic processor suite, while the remaining 98 aircraft are equipped with 1970's analog. Current plans are to fund 40 additional Update III suites for the P–3C force, leaving principally the P–3 Reserve force with the older analog technology ASW processing capability, which is incompatible with the new ASW sensors. To date, 18 ASQ–208 advanced digital Magnetic Anomaly Detector (MAD) systems, which have demonstrated superior localization/attack capability in littoral ASW operations, have been procured for the 600 air ASW platforms.

OTHER UNFUNDED NAVY REQUIREMENTS—SURFACE SHIP REQUIREMENTS

Senator McCain. Vice Admiral Lopez, in his prepared statement, Dr. Lowell Wood expressed concern about the narrow focus of the Navy in its submarine programs to the exclusion of other warfighting capabilities.

What about surface ship requirements? Are those fully funded?

Admiral Lopez. We have submitted a budget that adequately balances our surface ship Undersea Warfare (USW) requirements against the future threat. Our primary efforts have been focused against the shallow water threat posed by Third World navies with increasing numbers of advanced diesel submarines; however, we are maintaining a capability against the deep water threat posed by ongoing Russian advanced submarine quieting programs. We believe that we are applying our fiscal year 1997 budget prudently; so that, by the end of the FYDP we will have an adequate capability to match the threat. Additional resources would allow enhancement in the following areas.

Active Classification ($3.9M—RDT&E). There is only one active classification effort underway. This effort is focused on improvement of the AN/SQS–53C classification. Additional funding would allow the development of a broad based active classification program focused on solving active processing and classification issues for all threats, including submarines, torpedoes, and mines.

Cross Layer Detection/Bistatic Processing ($6M—RDT&E). The Navy is currently developing a new towed array and associated processing algorithms for bistatic cross layer detection. This system will enhance the capability of ships to detect and prosecute diesel submarines operating below the thermal layer in a littoral environment. The goal is to process both organic and off-board active acoustic transmissions. The effectiveness of this system can be maximized by pursuing efforts in the areas of acoustic data reduction, tactical data exchange, and tactical USW situation awareness.

Active Sonar Technology ($15M—RDT&E). The decline in passive sonar source levels has driven new development to focus on active sonar technologies, specifically broadband transmission and processing which rely on innovative lightweight transducer technology. Additional funds would allow further development of increased power-to-weight ratio transducers; thus, reducing the size and increasing the effectiveness of the next generation active sonars.

Surface Ship Torpedo Defense ($75M OPN+$82M RDT&E=$187M Total). The Surface Ship Torpedo Defense (SSTD) program is currently fielding a torpedo detection, classification, localization, and countermeasures system as early technology breakouts. This system has been incorporated in the AN/SQQ–89 Block improvement program for cruisers and destroyers. Procurement of additional systems for amphibious ships, combat logistics ships, and aircraft carriers is desired. A plan to procure six systems/year for $12.5M would permit installation in three amphibious, two combat logistic ships, and one CV per year.

The SSTD program also lacks a defined hardkill capability, which is required to meet operational effectiveness thresholds for wakehoming torpedoes launched against our large, less maneuverable ships. A proposal to make the Lightweight Hybrid Torpedo (LHT) a dual use USW and Anti-Torpedo Torpedo (ATT) has been researched and suggested by the Program Executive Officer (USW). An exploratory development (6.2) program and an Advanced Technology Demonstration (ATD) are in place to develop the necessary homing and fusing software. An additional $82M would be used to develop an engineering change to incorporate this function into the LHT and to conduct the necessary testing of the weapon to permit IOC in fiscal year 2003.

Lightweight Torpedoes $166M WPN. The current inventory of MK46 Mod SAS torpedoes is below objectives to detect and home on submarines operating in shallow water. There are currently two programs in place to modernize the existing MK46 inventory:

(1) The MK46 SLEP torpedo is an interim fix to the MK46 Mod 5AS. By incorporating limited counter-countermeasure technology and installing bottom avoidance logic a significant shallow water capability enhancement has resulted. Because this weapon still uses analog computation, all improvements necessary to meet shallow water requirements will not be possible. However, the MK46 SLEP is adequate to bridge the requirements gap until a significant inventory of LHTs is available. Currently there are 1100 MK46 SLEP torpedoes budgeted. An additional 400 will cost $5.6M.

(2) The LHT combines a MK46 warhead and afterbody with a MK50 array/transmitter and a powerful COTS processor. This torpedo is projected to meet all shallow water lightweight weapon capability requirements. Development is fully funded and is scheduled to transition to production in fiscal year 2000. The current program delivers 1000 LHTs by fiscal year 2010. By accelerating production the full inventory objective can be realized by fiscal year 2005 with significant cost savings. This would require an additional $40M year in fiscal years 2002–2005 and would result in a total program cost savings of approximately $74M.

Vertical Launch ASROC ($51M RDT&E). The Vertical Launch ASROC (VLA) weapon carries the MK46 Mod 5AS as a payload. This torpedo is inadequate for today's shallow water tactical applications. To give this weapon the necessary effective kill capability, conversion to the LHT is required. The cost to develop this conversion would be $51M.

FOCUS OF NAS PROGRAM

Senator McCAIN. In his prepared statement, Dr. Wood also discussed the narrow focus of the NAS program on quieting, to the detriment of other necessary capabilities, such as operational depth-rating and speed, torpedoes, and combat survivability.

Do you have concerns about the tradeoffs in military capabilities that were required to achieve *Seawolf* level quieting in the NAS?

Admiral LOPEZ. The Navy has no concerns about the tradeoffs in the NSSN's capabilities. The New Attack Submarine is designed to meet all military requirements at an affordable cost. Performance requirements predominantly determine the cost of submarines.

NSSN's combat superiority is clear. Nine independent studies have been conducted investigating the NSSN's capabilities. Each one has concluded that the speed, depth and payload of the NSSN are properly balanced while ensuring the acoustic superiority of the ship against current and future threats.

The Navy has aggressively investigated technologies that could provide the NSSN enhanced detection capabilities and found no technologies that allow the detection and localization of another submarine faster or more reliably than acoustic detection.

The Mk 48 ADCAP torpedo, an extremely versatile weapon, is the fastest, longest range heavyweight torpedo in the world, with a range to accommodate all future technological advances. NSSN supports all weapons in the current inventory, improves on the SSN 688 payload and provides a significantly improved salvo strike capability over its predecessor, *Seawolf*.

Submarines use depth for optimal sensor positioning with respect to sound propagation, contact avoidance and weapons evasion. The NSSN's depth capability is adequate for every scenario, allows effective use of water strata, and provides adequate room for weapons evasion and contact avoidance. Significantly increasing the NSSN's depth capability would result in little warfighting improvement while skyrocketing platform cost.

Speed is valuable for battle group support, rapid surge deployment and torpedo evasion. NSSN speed will be sufficient for these needs and is sufficient alone to evade most torpedoes. Increased speed does not significantly improve the chance of evasion. NSSN has substantially increased tactical speed over 688 class submarines, significantly improving its warfighting advantage.

Senator McCAIN. What was the principal driver in making these tradeoffs?

Admiral LOPEZ. The principal driver in making these tradeoffs was affordability. Studies determined that *Seawolf* level acoustic performance must be preserved while tradeoffs in *Seawolf* maximum speed, maximum depth, and payload were possible to decrease cost without compromising military utility. An Independent Review Group reviewed the Navy's decisions and concluded, "The New Attack Submarine design is technologically robust and reflects the correct balance between cost and state-of-the-art technology." The Milestone II COEA identified no more cost effective alternative.

Senator McCAIN. What would it cost to improve these other features of the NAS submarine without sacrificing quieting?

Admiral LOPEZ. The maximum speed, depth, and weapons load characteristics of submarines are determined early on in the design phase to establish the design parameters for the overall ship. These basic performance characteristics do not lend themselves to change after the submarine's design has been established. Attempting to change these characteristics later in the design or construction phase of the ships would require basic redesign of the entire submarine to fit new propulsion plant features, modifying hull and structural elements and modifying existing systems like ship control. Such changes can only be accommodated in a new design. However, the Navy has no concerns about the tradeoffs in the NSSN's capabilities. The New Attack Submarine is designed to meet all of its military requirements at an affordable cost.

Senator McCain. Do you agree that quieting, even if it is only comparable or perhaps slightly less than the quieting of Russian submarines, is the most important capability of the NAS?

Admiral Lopez. Submarine quieting is one of the most important capabilities of the NSSN. Today there are about a half a dozen Russian submarines at sea (and a similar number that are under construction) that are as quiet, at slow speeds, as our Improved 688 class submarines. Despite our advantages in combat systems and crew training, the margin of overall U.S. to Russian submarine superiority is at its lowest level in history. This is unacceptable. The *Seawolf* and New Attack Submarine (NSSN) will provide the quieting advantage to effectively reestablish our margin of superiority in acoustic stealth.

NON-NUCLEAR SUBMARINES

Senator McCain. In his prepared statement, Dr. Wood raises the idea of pursuing non-nuclear submarine programs which cost less and are highly mission capable. He cites that Australian Collins class submarine which cost about one-third of what the NSSN is estimated to cost. Are you familiar with the Australian submarines of the Collins class? What is your view of these particular submarines?

Admiral Lopez. The Australian Collins Class is a good example of the type of high quality non-nuclear submarine that can be produced by combining advanced submarine technologies which are readily available from a variety of exporters. However, the warfighting capabilities of the Collins class do not begin to approach those of U.S. nuclear submarines. Like all conventionally powered submarines, they have limited warfighting capability because they:

- Lack endurance and have a limited cruising speed:
  - High submerged speeds (> 20 knots) can only be sustained for very short periods (> 1 hour).
  - Maximum snorkeling (battery charging) speeds are typically 10–12 knots.
  - Maximum endurance is typically 75 days and about 5,000 nautical miles.

(These limitations effectively preclude rapid crisis response on a global basis. Additionally, Air Independent Propulsion (AIP) technologies only improve the slow speed endurance of conventional submarines. These systems still require a standard diesel-electric propulsion plant for high speed and long ranges.)

- Require a logistics supply train (fuel).
- Require expensive forward basing to be most effective.
- Are not capable of rapid response or multiple mission tasking.
- Are vulnerable to ASW prosecution, especially when snorkeling.
- Are not capable of some nuclear submarine missions:
  - Battle Group Support Operations
  - Under-ice operations

For these and other reasons, diesel submarines, such as the Collins, are generally acknowledged to be intended for security of home waters and those of neighboring countries. In contrast, the New Attack Submarine is designed as a multi-mission platform with the ability to rapidly deploy anywhere in the world and operate unsupported in joint littoral operations for extended periods of time. Although Collins is a capable submarine, its capability falls significantly short of the New Attack Submarine because of the diesel submarine's inherent electrical and propulsion power limitations. Propulsion power limitations affect endurance and the ability to evade an attacker (maximum sustained speed), which significantly impact warfighting capability. The following comparison of key attributes illustrates the vast superiority of the New Attack Submarine.

	Collins	New SSN
Length	254 ft	370 ft
Hull diameter	26 ft	34 ft
Displacement (submerged)	3350 tons	7500 tons
Max sustained speed	10 kts (snorkeling)	>25 kts
Unrefueled range	9000 NM	Unlimited
Crew size	42	115
Torpedo tubes	6	4

	Collins	New SSN
Vertical Launch tubes	0	12
Weapons carried	MK 48 torpedo Harpoon missile	ADCAP torpedo Harpoon missile mobile mines
Principal sonar array	10 ft cylindrical 94 hydrophone staves	15 ft spherical 1000+ transducers
Towed array	1 under development	2 installed
Hull array	Flank array	wide aperture array
Active sonar	Directional	Omni-directional
Mine Avoidance sonar	No	Yes
Total sonar hydrophones	2000	6000+
Special operations config	No	Yes
Automated defensive system	No	Yes
Battle Group interoperability	No	Yes
Under-ice capable	No	Yes
Acoustic intell gathering	Limited	Yes
Fiber optic system capacity	10 Mbit/sec	25,000 Mbit/sec
Sonar data output rate	1 Mbit/sec	30 Mbit/sec
Signal processing capacity	1.9 GOPS	190 GOPS
General computer processing	100 MIPS	8,000 MIPS
Sonar data storage capacity	130 Mbytes	>75,000 Mbytes

Senator McCAIN. Have you considered a mixed submarine force including both nuclear and non-nuclear submarines?

Admiral LOPEZ. The Navy has a continuing process to evaluate emerging submarine related technologies including non-nuclear propulsion technologies. Numerous studies on this issue have all concluded that only nuclear powered submarines can satisfy U.S. military requirements and ensure undersea superiority. Nuclear propulsion, and the endurance and agility that it brings, is unmatched by any other propulsion type. It enables enhanced tactical capabilities such as high search rates, unlimited submerged endurance, which maximizes its tactical stealth, and unmatched weapons evasion capability.

Executing the U.S. national maritime strategy during crisis situations or wartime involves the rapid deployment of attack submarines into forward areas. Our attack submarines must move swiftly and quietly over great distances to reach areas of operation. Once there, they must fight alone and unsupported. Each submarine must be highly mobile and capable of surviving multiple engagements. Only nuclear power provides the needed capabilities.

We are building attack submarines with the covertness, speed, firepower and endurance to execute our maritime strategy and prevail in hostile environments including the Arctic.

Non-nuclear submarines do not have the military characteristics to execute our maritime strategy. They cannot move rapidly to forward areas because of transit speed limitations. Their endurance is only a fraction of the attack submarine's on-station time because of long transit times required. Once on station, they lack speed and endurance to reposition. Therefore, the non-nuclear submarine cannot perform missions in the context of U.S. maritime strategy other than the fixed barrier mission. Construction of non-nuclear submarines for this limited role would be wasteful of national assets and would require forward basing for efficient employment.

Non-nuclear submarines are vulnerable to detection and prosecution. Their limitations make them exploitable by every ASW platform. Requirements to snorkel during transit and while on station expose the diesel submarine to repeated detection opportunities.

Non-nuclear submarines are not mobile. Their inability to move quickly in response to dynamic needs may make them unable to perform many missions. In contrast, U.S. nuclear powered submarines have been the first platforms on station in 90 percent of the crisis in the last two decades. Additionally, the relative immobility of non-nuclear submarines greatly increases the possibility of detection by ASW forces.

Once localized, the non-nuclear submarine is poorly equipped to evade because of limited speed and range.

Non-nuclear submarines cannot project power adequately to gain undersea superiority. The stressful missions required for the submarine force demand increased firepower and sensor capability as well as covertness and mobility. The non-nuclear submarine's size limits the sensors that can be installed and the number of weapons that can be carried. Any role for a non-nuclear submarine would be an extremely limited one.

Allied nations can support our maritime strategy with their non-nuclear submarines in limited roles. Our allies, with about 140 diesel-electric submarines are better suited for this mission and are able to contribute by operating their submarines near home waters.

Within the constraints of our limited resources, the Navy must focus its war plans on the threat to our national security. A mix of non-nuclear submarines and nuclear attack submarines would reduce our overall submarine force capability. The United States cannot afford to invest limited resources in non-nuclear submarines which reduce overall warfighting capability.

SUBMARINE HEATERS VS. WASTED HEAT FROM NUCLEAR POWER

Senator McCain. Nuclear propulsion results in about 70 percent waste heat. Our submarines dump this waste heat overboard and still provide discrete heaters on submarines. Perhaps the cost of heaters is not that high, but why don't we use some of this waste heat to eliminate the heaters?

Admiral Lopez. Electric heaters are an efficient, cost effective way to heat spaces when necessary. Using waste heat from other sources would necessitate installing a new heating system. This would cost far more than using the current electric heaters.

INDUSTRIAL BASE ARGUMENTS

Senator McCain. In Mr. Battista's prepared statement, he addressed the issue of the submarine industrial base. In fact, in his statement last year before the House National Security Committee, he said that . . . there was more concern over the industrial base and the urge to 'build something' than there was over the future of the fleet. He went so far as to term industrial base arguments for *Seawolf* and the NAS as specious. I must say I agree with him on this point.

Mr. Battista specifically recommended using overhaul work on the SSN-688 fleet to retain workforce capabilities at our submarine building yards until a new attack submarine design is ready to build.

Could you elaborate in this idea? How long do you think we could maintain the required capability at our yards using overhaul work?

Admiral Lopez. The Navy is inactivating only those SSN 688s not needed to maintain the force level. Refueling the small number of early SSN 688s planned for inactivation would neither sustain state-of-the-art technology for submarine design and construction nor meet military requirements for advanced submarines. Further, refueling those SSN 688s planned for inactivation would not change the number of new SSNs which must be built to meet SSN force level requirements in the next century. In addition, SSN 688s have little or no margin for further upgrades.

Overhaul/upgrade of these ships would result in only limited performance enhancements and mission area extension is beyond reach. Fundamental ship characteristics, such as stealth (vulnerability to high performance threats), or weapons payload, cannot be changed through the overhaul approach.

Submarine overhauls do not require the same type or magnitude of design effort associated with new submarine development. Similarly, overhauls do not require and, therefore, do not preserve the mix of construction skills demanded by new submarine construction. Further, overhauls do not provide much work for nuclear and non-nuclear major component suppliers. Without new submarine construction, many nuclear and non-nuclear component suppliers will go out of business and the talent, skills and discipline to design, build, test and integrate these components will be lost. If we stop building submarines, the capability to design and build nuclear powered submarines will atrophy. Reconstituting a nuclear capability would be time consuming and costly, assuming it could be done at all.

Senator McCain. What would be the cost savings if we were to maintain the existing 688 fleet rather than retiring these submarines early?

Admiral Lopez. There would be no savings if the Navy were to maintain the existing SSN 688 fleet rather than retiring those ships not needed for force level requirements. Retaining these ships would cost the Navy an additional approximately $4.5B in refueling overhaul costs, direct operating and support costs and indirect support costs. The Navy would still need to build the same number of NSSNs as currently planned to maintain out year force levels without resorting to unrealistically high procurement rates.

Senator McCain. Mr. Battista recommends continuing the design work on the New Attack Submarine but specifically you do not agree that the NAS should be used as the lead ship of a new class of submarines. Vice Admiral Lopez and Secretary Douglass, would you please respond to these same questions.

How long do you think it would take to complete the design work on a new class of submarines?

Mr. DOUGLASS. The time to complete the design work on a new class of submarines is typically up to 15 years. The New Attack Submarine design process will span about 12 years, with the majority of the design being completed in the first 7–8 years.

Senator McCAIN. How long could we delay production of the NAS without harming the industrial base or jeopardizing the viability of our submarine force?

Mr. DOUGLASS. The industrial base will be immediately impacted if we do not begin production of the New Attack Submarine in fiscal year 1998, preceded by advanced procurement of components in fiscal years 1996 and 1997. There currently is not enough submarine component backlog existing to sustain the industrial base. Any further hiatus in submarine production would require shutting down a significant portion of the shipbuilder and component industrial base. Reconstitution costs would be prohibitively expensive.

When the *Seawolf* program was truncated in 1992, there was still enough submarine construction backlog (8 submarines: 3 SSBNs and 5 SSNS) to sustain the industrial base. The industrial base is currently only supporting the construction of two SSN 21 submarines with the last *Trident* submarine undergoing outfitting and testing prior to sea trials next year. The industrial base is downsizing to support the construction of the New Attack Submarine class at a construction rate of about two per year. If the same truncation were to occur now in the New Attack Submarine program, many companies would permanently close down their submarine component manufacturing activities, and the ability to build advanced nuclear submarines would be irrevocably harmed.

Furthermore, delaying New Attack Submarine construction would jeopardize the ability to provide the 10 to 12 submarines with *Seawolf* level quieting by 2012 required by the Joint Chiefs of Staff to sustain the overall SSN force level.

CAPABILITIES OF NAS

Senator McCAIN. In his prepared statement, Mr. Polmar stated that, while the NAS will have the same quieting as the *Seawolf*, most if not all other NSSN characteristics will be inferior to those of the *Seawolf* (speed, depth, weapons, etc.). Yet, the NAS program, which is currently projected to cost $60 billion for 30 submarines, is about as costly as the projected costs of the *Seawolf* program when it was first proposed.

What are the most important capabilities for a new class of submarines, in your view, based on likely threats of the future?

Mr. DOUGLASS. To meet current and projected threats, the New Attack submarine must be a multimission capable ship. The Joint Requirements Oversight Council (JROC) of the Joint Chiefs of Staff determined that a submarine must be able to carry out the following seven specific missions:

- Covert Strike Warfare
- Antisubmarine Warfare
- Covert Intelligence Collection/Surveillance, Covert Indication and Warning, and Electronic Warfare
- Antisurface Ship Warfare
- Special Warfare
- Covert Mine Warfare
- Battle Group Support

The New Attack Submarine is a highly capable, technologically robust warship, designed to perform the seven missions described above. The New Attack Submarine is the Navy's first submarine designed to satisfy a broad spectrum of regional and littoral mission requirements while retaining blue-water undersea battlespace dominance. With added emphasis on expeditionary warfare in the littoral environment, it will surpass the warfighting and peacetime performance of any current and projected threat submarine.

Most importantly, the New Attack Submarine will retain *Seawolf* level quieting—an attribute JCS requires for advanced submarines. Moreover, compared with previous classes of ships, the New Attack Submarine will have improved electromagnetic stealth, sophisticated surveillance capabilities, and special warfare enhancements. The ship will carry advanced capability heavyweight torpedoes, and all land-attack and anti-ship cruise missiles and mines in the present and planned inventory.

The sonar system will include a bow mounted spherical active/passive array, high-frequency chin and sail arrays, both thin-line and fat-line towed arrays, and a lightweight wide aperture array. The sail will house two photonics masts for improved imaging functions, an improved electronic support measures mast, and multi-function masts that cover the frequency domain for full spectrum communications. The design includes extremely high frequency and super-high frequency communication masts as well as accommodations for a special mission configurable mast.

The New Attack Submarine will feature an integral lock-out/lock-in chamber for special operations, and is designed to host vehicles to deliver Special Operations Forces. The torpedo room design will permit reconfiguration to host special operations personnel and their equipment.

The New Attack Submarine design provides flexibility for affordable insertion of new technology to respond to changing missions and threats. Innovations, such as open systems architecture electronics and the modular isolated deck structure, permit affordable incorporation of new technology as it becomes available.

Senator MCCAIN. Do you believe proceeding with the NAS program now, as it is currently designed, would be a mistake?

Mr. DOUGLASS. No. Proceeding with the New Attack Submarine is the right course and action. The New Attack Submarine is designed to meet all of its military requirements at an affordable cost. It is the Navy's first submarine designed to satisfy a broad spectrum of regional and littoral mission requirements while retaining blue-water undersea battlespace dominance. Along with *Seawolf* level quieting, the New Attack Submarine will have improved electromagnetic stealth, sophisticated surveillance capabilities, and special warfare enhancements as compared with previous classes of ships.

Furthermore, attack submarine designs are not static. They evolve in response to changing requirements and technology. The *Los Angeles* class is a prime example of this. The last ship of the class bears little resemblance to the first. The class design has evolved through several flights which modified the original design to incorporate blocks of improvements to the class.

For example, the improved SSN688s (referred to as 688Is) have a significant modified propulsion machinery plant, a digital combat system and weaponry, and vertical launch tubes. These attributes were not part of the original design. The ability to incorporate further significant changes to SSN 688 class ships is now precluded as all the growth margin designed into these ships at the outset of the design has been used up.

The New Attack Submarine is designed to accommodate the evolution of technology and change in the threat. The flexibility of its design includes enhanced modularity, isolated decks, reconfigurable spaces, open system architecture, a robust fiber optic cable system, and commercial off-the-shelf equipment.

RUSSIAN SUBMARINE TECHNOLOGY

Senator MCCAIN. Mr. Polmar, you discuss at some length in your prepared statement the various quieting and other technologies under development in the Russian submarine program. However, as we all know, and as you correctly state, the current political and economic conditions in Russia mitigate against an effective submarine program. However, the Navy continues to maintain that the Russian submarine program is robust and poses a significant threat of a technologically superior Russian submarine fleet in the near future.

Do you agree with the threat assessments provided by the Navy of the future Russian submarine force?

Vice Admiral Lopez, would you please respond to the question?

Admiral LOPEZ. Despite its well-publicized economic problems, Russia continues to produce nuclear submarines, albeit at a slower rate, which are technologically sophisticated and exceptionally quiet. Russia also continues to produce conventionally-powered submarines for export to the worldwide market. The Russians believe in the strategic importance of their ballistic missile submarine force, the offensive and defensive capabilities of their nuclear attack and anti-ship cruise missile carrying submarines and the economic benefit derived from exporting submarine technologies and platforms.

Additionally, within the Intelligence Community there is agreement that the future Russian submarine force will be composed of modern, combat efficient strategic ballistic missile, nuclear attack and conventional submarines. There is no disagreement in the Intelligence Community that the next generation Russian nuclear attack submarine class is under construction and no disagreement as to the assessed capabilities of that class.

Senator MCCAIN. If so, could you tell us what you view as the future of the Russian submarine force?

Vice Admiral Lopez, would you please respond to the question?

Admiral LOPEZ. The future Russian nuclear attack submarine fleet will be a higher quality force, while being reduced in quantity. Since the late 1980's, the Russian Navy has been steadily decommissioning older, maintenance-intensive submarines, and we expect this trend to continue. The Russians have also begun construction of a new generation of nuclear attack submarines (SSN), and a new generation of ballistic missile submarines (SSBN) is expected to appear after the turn of the century. By the year 2000, there will be one to two of the new generation SSNs in the Russian submarine force. The current operational order of battle is primarily composed of the most modern Akula, Sierra, Victor III and Oscar class submarines.

All have improved sensors, weapons, and sound quieting improvements compared with the former Soviet submarine force of the mid-1980's. In 10 years, accounting both for retirements and newly constructed units, the Russian nuclear submarine force will be composed of approximately 30 submarines, about one third of which will be ballistic missile submarines.

Russia continues to rely on strategic deterrent forces for national security. However, aging strategic systems and lack of funds for new systems threatened to reduce their strategic arsenal to unacceptably low levels. The Russians have made tough, practical decisions to stretch out the lives of their remaining weapon systems. This policy results in a higher percentage of the remaining nuclear warheads being allocated to ballistic missile submarines (SSBNs). Hence, SSBNS, along with the attack submarines which protect them, are increasingly important to Russia's nuclear deterrent posture. Thus, the Russian Navy is clearly choosing quality over quantity.

Finally, while the current submarine force is not operating as much as the Soviet submarine force did, their overall operating rate has been generally steady for the past 4 years. In several cases, especially during the past year, these operations have demonstrated the Russian's continuing ability to perform wartime missions of anti-submarine and anti-surface warfare in a variety of locations.

Senator MCCAIN. What is your assessment of the likelihood that Russia will be able to sell its submarine technology to other countries? If so, what would be the impact on the Chinese or other submarine capabilities?

Vice Admiral Lopez, would you please respond to the question?

Admiral LOPEZ. The likelihood of Russia selling its submarine technology to other countries is high. Russia has been actively marketing its submarine technology at international exhibitions since 1992. Most recently, at the International Exhibition "Defense Services ASIA 96" held in Malaysia in April, the Rubin Design Bureau of St. Petersburg aggressively advertised its Project G36 Kilo Class diesel-powered submarine. Indonesia is the only Southeast Asian country currently operating submarines, but Thailand, Singapore, and Malaysia have all shown an interest in acquiring them. Yuri Kormilitsin, the chief designer at Rubin, is quoted in the Russian press as saying "Russia has to compete, primarily, with Sweden, then Germany and Australia on the markets in Southeast Asia."[1] Also in April, Russian President Yeltsin and Defense Minister Grachev returned from a trip to China.

Russian arms exports to China are reported in the press as reaching $5.2 billion.[2] The sale of Kilo Class submarines to China is part of this package.

Since the Kilo SS is a rather large conventionally-powered submarine, 2325 tons surfaced displacement, it may be at a disadvantage in competing with smaller Western European designs in countries that only have a coastal defense mission. Nevertheless, countries that already have submarines realize it is important to acquire quieting technology and advanced weapons systems to improve their undersea warfighting capability. The three areas of submarine technology, all associated with quieting, that Russia is most likely to sell to other countries are: anechoic coatings (anti-echo/sound dampening); technology to manufacture highly skewed propellers (quiet propulsion); and pneumatic sound mounts for machinery quieting. The three areas of weapon systems being offered for sale by the Russians are torpedoes, mines and cruise missiles. The Russians are currently offering for sale and have exported anti-submarine torpedoes and anti-ship wake-homing torpedoes. A developmental, rocket-propelled, high-speed torpedo has also been advertised for sale with a future class of export submarine. Mobile mines, vintage bottom mines and advanced bottom mines with pressure sensors are also for sale by the Russians on the export market. Russia also has advertised three different submarine launched anti-ship cruise missiles which are only developmental in nature.

The impact on the capabilities of a country with an obsolescent submarine force like China could be great. We know China is actively seeking to acquire advanced technologies. The recent purchase of Russian Kilo SS submarines, including the more capable domestic version, provides China with modern Russian technologies.

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[1] ITAR–TASS, "Rosvooruzheniye presents KILO–636 Class Sub in Malaysia", 25 April 1996.

[2] Sankei Shimbun, "Russia's Arms Exports to PRC Reaching $5.2 Billion", 25 April 1996.

The majority of the Chinese submarine fleet currently consists of aging 1950s vintage technology Romeo SS submarines built in China (from Russian plans) between 1964 and 1985. (To date China has only demonstrated a limited submarine-launched anti-ship cruise missile capability, having fired a C801 cruise missile from a surfaced Romeo Class submarine.) The Chinese are still producing a modified Romeo design, designated the Ming SS. The MING SS is at best a stopgap measure taken until construction of the China's next generation diesel submarine, the Song SS, is in full series production.

While block obsolescence will greatly shrink China's present fleet of aging diesel submarines, new submarine construction is one of China's highest priorities. New classes of diesel and nuclear submarines are under construction or in the design stage. China's indigenously-designed, conventionally powered Song SS was launched in 1994. Its hydrodynamic hull form and single shaft line represent a significant departure from previous Chinese designs. All external features appear to have been designed to make the SONG SS quieter than any other Chinese diesel submarine ever built, but probably not as quiet as the Russian-built Kilo SS submarines they are acquiring. The Kilo Class submarines will have greater endurance, improved sonars, and more capable weapons that those characteristic of the Ming and Romeo Classes.

Modern Russian technologies transferred to China in the Kilo SS, and Western technologies available on the international arms market, will appear in the next generation of Chinese nuclear attack and ballistic missile submarines. Production of these new submarine classes will begin between 2003 and 2005. Although the size of China's submarine force will undoubtably decrease over the next few years, the capability of its platforms will improve dramatically.

PROTOTYPE SUBMARINES

Senator McCAIN. Mr. Polmar, you advocate production of two operational prototype submarines, one built by Electric Boat and one by Newport News, to ensure appropriate design competition and development of a superior follow-on attack submarine. Vice Admiral Lopez and Secretary Douglass, would you please respond to these same questions.

What funding would be required to carry our your recommendation?

Mr. DOUGLASS. Prototyping at the ship level would be extremely costly from the design and supportability and industrial base perspectives. For each prototype ship, you could expect to spend approximately $1 billion on the design effort. The logistics costs could also be expected to increase for any unique supportability aspects (e.g., equipment, parts, training, etc.) that each prototype ship might have. Life cycle support costs would lack the economies of scale associated with class construction.

The current program of record has lead ship authorization in 1998, leading to delivery in 2004. If this effort were suspended to return to conceptual studies leading to another design, we would be inserting several years of delay into the process. Delayed order dates for numerous submarine components would further erode the submarine vendor base that has seen only four submarines ordered in the 1990s—SSN 773, the last 688 Class submarine at Newport News, SSBN 743, the last *Trident* submarine at Electric Boat, and SSN 22 and SSN 23, the last *Seawolf* Class submarines at Electric Boat.

To satisfy requisite SSN force levels, without resorting to budget prohibitive building rates in the future, the Navy must procure SSNs at a rate of about two ships per year through the next decade. We have neither the fiscal resources nor the time necessary to design, build and test multiple prototype ships prior to settling on a new class of attack submarines.

Senator McCAIN. What is the impact of that recommendation on the industrial base arguments, both design and production?

Mr. DOUGLASS. While it is always possible to make something better with time and resources, there are no technologies or groups of technologies which provide significant sustenance to the industrial base while enhancing submarine performance or affordability to warrant delay in the New Attack Submarine effort. The New Attack Submarine, more than any prior submarine, has factored technology insertion into its flexible design.

The Navy must start construction on the lead New Attack Submarine in fiscal year 1998 and begin low rate production to:

- minimize SSN costs and risks
- sustain an already fragile submarine and nuclear industrial base
- maintain minimum force level

The Navy can accept fully demonstrated advanced technologies after risks are reduced and effectively engineer them into the New Attack Submarine, as warranted by the benefits of the technologies. Continuing the design of the New Attack Submarine to support lead ship construction in fiscal year 1998 fully supports both the production and design segments of the submarine industrial base.

Senator McCain. What would be the utility to our submarine force of having two, unique operational prototype submarines in the fleet?

Admiral Lopez. The submarine force's use of two operational prototype submarines would be dictated by force requirements and the prototype submarine's capabilities. Effective use of the prototypes would require that they have the multimission capability that will be provided by the NSSN.

Although unique prototype submarines may provide some capability to assess new technologies once they are built and go to sea, the ability to more quickly and effectively evaluate new technologies through cost effective modeling and simulation makes production of unique prototype submarines a poor use of the Navy's acquisition dollars. Additionally, they would represent a poor use of the Navy's future operation and maintenance dollars, as life cycle support for unique prototype submarines would be higher than for other submarines. The design of the NSSN provides the necessary flexibility for incorporating new technologies and ensures submarines that are built meet necessary military requirements.

SUBMARINE CAPABILITIES FOR THE FUTURE

Senator McCain. Vice Admiral Baciocco discussed at great length in his prepared statement the performance tradeoffs and design deficiencies in the New Attack Submarine, which he said were driven by affordability concerns. He stated Affordability tradeoffs made early in the designed resulted in performance tradeoffs which could limit the platform if radical changes occur in the threat or assigned mission. He also stated, the baseline design lacked certain desirable features which would probably be needed in the future..

Another witness, Dr. Lowell Wood, addressed these same issues, stating that the New Attack Submarine is a diminished *Seawolf* boat with a new name.

This is a serious limitation. In my view, one of the most difficult problems facing us today is the lack of certainty about future threats to our national security, particularly in view of the political volatility in Russia and the desperate state of their economy. Planning our future force structure must, therefore, emphasize flexibility to meet unforeseeable threats.

Why, then, do you conclude that we should proceed with the New Attack Submarine program.

Mr. Douglass. The New Attack Submarine is the quintessential stealthy multipurpose warship whose endurance, agility and offensive firepower are uniquely valuable across a wide range of demanding missions. It is the Navy's first submarine with design features that satisfy a broad spectrum of regional and littoral mission requirements while retaining blue-water undersea battlespace dominance. The New Attack Submarine is designed to carry out the following seven specific missions:

- Covert Strike Warfare
- Covert Intelligence Collection/Surveillance, Covert Indication and Warning, and Electronic Warfare
- Antisubmarine Warfare
- Antisurface Ship Warfare
- Special Warfare
- Covert Mine Warfare
- Battle Group Support

The New Attack Submarine design provides flexibility for affordable insertion of new technology to respond to changing missions and threats. Innovations, such as open systems architecture electronics and the modular isolated deck structure, permit affordable incorporation of new technology as it becomes available.

The New Attack Submarine Command, Control, Communications, and Intelligence (C^3I) system design will employ open system architecture and a fiber optic network. This will enable the expanded use of nondevelopmental items and commercial components for connectivity among sonar, fire control, navigation, electronic support measures, and communication systems. Integrated electronic systems with commercial components will allow state-of-the-art technology insertion throughout the lifetime of the class.

Consequently, the submarine's electronics design can benefit from the rapid advances being made in the commercial electronics industry.

The Modular Isolated Deck Structure (MIDS) is the innovative design feature which provides the necessary shock and acoustic isolation for commercial grade electronics. MIDS is a key part of the ship's enhanced modular approach. This approach facilitates technology insertion in follow ships of the class since individual modules can be redesigned and constructed without unnecessarily impacting the whole ship's design. The enhanced modular approach will cut construction costs and permit the incorporation of mission-specific hull sections during future construction. This allows the Navy to more easily and cost effectively insert new technologies and incorporate improvements to existing components and systems on individual ships throughout its service life.

The New Attack Submarine design will yield a cost effective ship, providing the nation with technologically robust, highly capable, multi-mission submarines which meet 21st Century operational requirements. It will sustain the nation's ability to design and build advanced nuclear attack submarines and will ensure our margin of superiority in submarine warfare. The New Attack Submarine design balances military performance and affordability, while providing flexibility for future technology insertion.

In addition, the Navy needs to start building NSSNs this decade to replace SSN 688s, which will reach the end of their service lives in large numbers early in the next century. The first NSSN will not deliver until 2004. Delaying NSSN construction, even a short time, will require unrealistic build rates (3–4 per year) to maintain SSN force levels.

Senator McCain. Are there any performance advantages of the NSSN over the *Seawolf*?

Mr. Douglass. There are several performance advantages of the NSSN over the *Seawolf*. Operation and maintenance of the NSSN is much simpler. The vertical launch capability of NSSN increases the salvo strike rate significantly over *Seawolf*. In addition, NSSN maintains the open ocean ASW and acoustic capability of the *Seawolf*, while significantly increasing littoral capabilities. These include:

- an organic Special Forces (SOF) capability,
- a squad sized lock out trunk,
- a SOF vehicle compatibility,
- a reconfigurable torpedo room for SOF personnel or advanced equipment,
- an advanced waste processing system,
- an improved gas management system ,
- improved shallow water ship handling features including dihedrals, a variable speed outboard, a robust automatic hovering system, an improved inertial navigation system, and a velocity measurement system.

Senator McCain. In terms of affordability, what happens to projected costs for the New Attack Submarine program in view of your recommendation that continued design evolution is necessary?

Mr. Douglass. The Navy's preliminary estimate is that an increase of $60 million per year in Research, Development, Test and Evaluation funding might be required to maintain a core capability to mature and transition submarine technologies from the research and development stage.

The Secretary of Defense Report on Nuclear Attack Submarine Procurement and Submarine Technology provided a prioritized listing of technologies that are candidates for insertion in New Attack Submarines. Although these technologies are not mandatory to meet the mission requirements of the submarine, they could further enhance performance or affordability. The technologies were grouped into three categories, which represented optional levels for investment over the next 7 years:

Category I—$165M
Category II—$377M
Category III—$1,633M

INADVISIBILITY OF CONGRESSIONALLY DIRECTED TECHNOLOGY DEVELOPMENT

Senator McCain. Vice Admiral Baciocco noted in his prepared statement that of the technology areas specifically designated as Congressional interest areas, only seven were available in the near term and none of these were deemed to have high military utility after examination by the submarine technology assessment panel. I find this an interesting, concrete example of the inadvisability of Congress setting the priorities and establishing programmatic direction without benefit of input from the military services or technical experts. Would you please comment on this matter?

Mr. Douglass. The Navy concurs in the panel's finding that there are no near term applications of high military value, nor that any are necessary to meet the established mission requirements of the NSSN. While the Navy believes there are valuable future applications of technology in all ten of the congressional interest areas, the input from the services and technical experts is a necessary part of the process to establish programmatic priorities and direction.

[Whereupon, at 5:03 p.m., the hearing was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1997 AND THE FUTURE YEARS DEFENSE PROGRAM

THURSDAY, MARCH 28, 1996

U.S. SENATE,
SUBCOMMITTEE ON SEAPOWER,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

MULTIYEAR PROCUREMENT PROPOSAL FOR THE C–17 STRATEGIC AIRLIFTER

The subcommittee met, pursuant to notice, at 3 p.m., in room SR–222, Russell Senate Office Building, Senator William S. Cohen (chairman of the subcommittee) presiding.

Present: Senators Thurmond, Warner, Cohen, Lott, and Lieberman.

Committee staff members present: Romie L. Brownlee, staff director and George W. Lauffer, deputy staff director.

Professional staff members present: Stephen L. Madey, Jr.

Minority staff members present: Creighton Greene, professional staff member.

Staff assistants present: Shawn H. Edwards and Franklin H. Turner.

Committee members' assistants present: Judith A. Ansley, assistant to Senator Warner; Dale F. Gerry, assistant to Senator Cohen; Ann E. Sauer, assistant to Senator McCain; Richard F. Schwab, assistant to Senator Coats; Andrew W. Johnson, assistant to Senator Exon; Steven A. Wolfe, assistant to Senator Kennedy; John P. Stevens, assistant to Senator Glenn; and John F. Lilley, assistant to Senator Lieberman.

OPENING STATEMENT OF SENATOR WILLIAM S. COHEN, CHAIRMAN

Senator COHEN. The subcommittee will come to order.

The Seapower Subcommittee meets today to consider an offer by McDonnell Douglas Corporation for multiyear procurement of the C–17 aircraft. The offer may be a good opportunity to buy airlift at a savings, but before accepting briefing slides as a substantial offer, we ought to work today to understand the burden of such a long-term commitment and get a clearer picture of the advantages of agreeing to such an obligation. That benefit has to be shown before making a commitment.

The issue before us is both substantial and procedural. As I am sure you are going to see, a 7-year obligation of more than $20 billion deserves careful consideration—more consideration than previously available for this issue. I would encourage the Department to save itself unnecessary delay and difficulty in the future by following accepted procedure and submitting requests for multiyear authority to the authorizing committee.

You may take note that this chairman takes great offense at the way in which this was arranged. It was this committee, the subcommittee and the full committee, which was responsible for helping to bail out the C–17 program. The notion that somehow this would be slipped into an appropriations process without so much as even advising the chairman of the subcommittee or the full committee of what the request was going to be I found particularly offensive.

I think it is fair to point out that we made a positive difference for the C–17 during its troubles. When the settlement was offered, it was the armed services committee that first approved it in markup and later fought for it on the Senate floor. We are gratified by the C–17's subsequent successes, but disappointed by the Department's attempt at bypassing the committee.

The C–17 program has come a long way from its near-death experience. Before we expect it to run a marathon, there should be a thorough check to protect everyone involved. A long-term commitment of more than $20 billion must be based, again, on something more substantial than briefing slides.

We welcome your testimony in the efforts to help us consider this important issue.

Mr. Rodrigues, perhaps you can begin. I might indicate that the chairman of the committee will be arriving shortly. I will interrupt the proceedings at that time so he can make a statement. Then we will proceed from that point on.

So, Mr. Rodrigues, Dr. Kaminski, Mr. Kozlowski, thank you for being here, and let us proceed.

STATEMENT OF LOUIS J. RODRIGUES, DIRECTOR, DEFENSE ACQUISITIONS ISSUES, NATIONAL SECURITY AND INTERNATIONAL AFFAIRS DIVISION, GENERAL ACCOUNTING OFFICE

Mr. RODRIGUES. Thank you, Mr. Cohen. If I could have my full statement submitted for the record, I will proceed with a short version.

Senator COHEN. It will be included in the record.

Mr. RODRIGUES. I am pleased to be here today to discuss the proposed C–17 multiyear procurement. This is a particularly critical decision, because the proposal will require legislation to authorize a 7-year multiyear contract, and because of the short time allowed for congressional action. Multiyear procurement authority has historically depended on the ability to obtain a savings, a sufficiently stable design, an adequately validated requirement, and a commitment for stable funding.

Let me first address savings. The Air Force estimates that approval of the multiyear request will save about $896 million. However, some of these savings could be achieved without entering in a multiyear agreement. Also, the contractor has characterized achieving some of these savings as a management challenge. In addition, the savings from the engine manufacturer are estimated at $122 million. But the contractor, Pratt & Whitney, has only indicated a willingness to offer an $88-million discount. Also, the Air Force was unable to identify the source of an additional $14 million in savings that it presented as coming from "other sources".

The next criteria used in judging a multiyear contract is the extent the design is stable and can be produced. We have several concerns about the stability and the inherent risk in the increase in production.

First, there are several unresolved problems that will require engineering changes that were identified during the initial operational test and evaluation. Second, the Air Force has identified about $1 billion in research and development funds that would be needed to develop improvements, and about $1.8 billion that will be needed to accommodate engineering changes, product improvements, and planned modifications. Finally, the C–17 is about 18 months away from having an aircraft configuration that fully conforms to the required specification.

In addition to the possible changes to the aircraft, the contractor is currently implementing changes in aircraft design and production methods that have been identified as cost-savings improvements. It is not clear how these changes will effect the contractor's ability to meet the proposed production schedules.

Another criteria for evaluating multiyear procurement is an assurance that the number of aircraft to be acquired is the correct number. Based on work that we are currently doing at the request of Congresswoman Elizabeth Furse, we do not believe that 120 C–17 aircraft are needed to meet the current requirement.

Finally, there should be assurance of funding to support the contract at the proposed production rates. It appears from looking at the future years defense plan that the Air Force has identified sufficient funds to support the proposal.

As you know, the multiyear contract has not yet been negotiated. However, Air Force officials have told us that the multiyear contract would be based on the recently signed Lot 8 contract, which contains fixed-price options for Lots 9 through 11, or 30 aircraft, and also contains fixed-price incentive successive target options for the remaining lots, covering the final 50 aircraft of the 120-aircraft buy.

Program officials also negotiated an extensive variation-in-quantity clause, which included an accelerated production schedule. This clause requires that once a production rate has been reached, it cannot be decreased except for the final lot. Further, once the production rate has exceeded 12 aircraft, it must be increased to the maximum rate of 15 a year. If these conditions are not met, the remaining option prices are invalid and must be renegotiated.

The multiyear contract will only include the accelerated schedule from Lot 8. However, both Air Force and company officials told us that they intended to include a provision in the multiyear contract that will allow the Government to revert back to the Lot 8 annual buy contract options without renegotiating those option prices, provided that the conditions I mentioned were not violated.

Mr. Chairman, this is a very significant provision, because it would provide Congress, until the fiscal year 1999 authorization and appropriation cycle, to make a final decision on continuing the multiyear program. The multiyear offer is also contingent upon the use of performance-based financing provisions. This is a departure from the normal 75 percent progress payment arrangement.

It entails negotiating predetermined events, and payments for each of these events for the remaining 80 aircraft. The events have been identified. However, each event must still be defined as to what constitutes completion and the amount of financing that would be provided for completion of the event. Program officials told us that the effect of this financing arrangement is equivalent to a 90-percent progress payment rate.

In closing, Mr. Chairman, it is our opinion that the Congress should require that a provision which would allow reverting to the Lot 8 annual-buy contract is included in any multiyear contract. With that provision, the Government would have until the fiscal year 1999 authorization and appropriation cycle to assess the contractor's ability to produce the aircraft at the required rate. If the contractor's performance is not adequate, the Government could revert to the Lot 8 annual-buy contract without renegotiating the not-to-exceed-option prices for the remaining lots.

We also believe that Congress may wish to require the Department to provide assurances, along with its 1999 budget request, that the contractor is ready to move to the higher production rates. Overall, we believe savings would be achieved from the multiyear procurement of the C–17. However, the savings directly attributable to multiyear will likely be less than the $896 million estimate, and will entail both cost and risk.

Given the uncertainty regarding the design stability and the risk associated with increasing production, we believe a further assessment of the merits of the C–17 multiyear program may be warranted, and can be accommodated under the proposal.

Mr. Chairman, this concludes my prepared remarks, and I would be glad to answer any questions.

[The prepared statement of Mr. Rodrigues follows:]

Prepared Statement by Louis J. Rodrigues

Mr. Chairman and Members of the subcommittee: I am pleased to be here today to discuss the proposed multiyear procurement of the C–17 aircraft. This is a particularly critical decision because this multiyear proposal would require legislation to authorize a 7-year multiyear contract. The short time frame for congressional consideration (McDonnell's offer expires on June 1, 1996) also places an unusual burden on decision makers. Mr. Chairman, I want to emphasize that we are commenting on a proposal for a contract that has not been drafted. We are, therefore, unable to comment on the specifics of the proposed contract.

RESULTS IN BRIEF

Approval of multiyear procurement authority has historically depended on the ability to obtain significant savings, a sufficiently stable weapon system design, an adequately validated requirement, and a commitment to stable funding over the life of the contract.

The Air Force estimates that approval of its request for multiyear procurement authority to complete the planned C–17 program will save about $896 million. However, the amount of savings likely to occur as a result of a multiyear procurement is overstated. At least some of the savings—about $300 million—could be achieved without entering into a multiyear agreement. The government could have invested a portion of the proposed multiyear funding in additional cost-reduction initiatives such as those that have been funded by the contractor in response to the 1994, C–17 settlement and other cost-reduction initiatives funded by the government. Additional savings have been characterized by the contractor as a "management challenge."

The savings from the engine manufacturer are estimated at $122 million but in reality are likely to be less. The contractor has indicated a willingness to offer an $88-million discount for a multiyear contract.

In January 1994, the C–17 program manager estimated that a 120 aircraft program would cost about $43 billion. At that time DOD reduced the program to 40 C–17's unless McDonnell Douglas significantly improved the cost, schedule, and performance of the aircraft. Since then the Department of Defense (DOD) has reported airframe cost savings of about 20 percent as a result of actions by the government and the contractor. However, this savings along with the savings that will accrue from both the accelerated production rate called for in the multiyear proposal and the estimated multiyear savings are needed to keep costs from exceeding the January 1994, $43 billion estimate.

The next criteria used in judging a multiyear contract is the extent that the design is stable and can be produced at the designated rate. We have several concerns about the stability of the design and the inherent risks in the increase in production which is called for in the multiyear proposal. First, there are several unresolved problems that could require engineering changes to the aircraft that were identified during the C–17 initial operational test and evaluation (IOT&E). Second, the Air Force has identified about $1 billion in research and development funds that will be needed to develop improvements to the aircraft and about $1.8 billion that will be needed to accommodate engineering changes, product improvements, and planned modifications between 1997 and 2004. Finally, the C–17 is about 18 months away from having an aircraft configuration that fully conforms to the required specifications.

In addition to the possible changes to the aircraft that could affect the viability of a multiyear proposal, the contractor is currently implementing changes in aircraft design and production methods that have been identified as cost savings improvements. it is not clear how these changes will affect the contractor's ability to meet the proposed production schedules.

Another criteria for evaluating a multiyear procurement is a assurance that the number of aircraft to be acquired is the correct number. Based on work that we are currently doing at the request of Congresswoman Elizabeth Furse, we do not believe that 120 C–17 aircraft are needed to meet current requirements.

Finally, before approving a multiyear procurement, Congress should be assured that funding to support the contract at the proposed production rates has been included in DOD's planned future procurement. It appears from looking at the Future Years Defense Plan that the Air Force has identified sufficient funds to support the proposal.

Overall, we believe some savings could be achieved from a multiyear procurement of the C–17. However, the savings will likely be less than the current $896 million estimate and will entail both costs and risks. Given the uncertainty regarding the design stability and the risk associated with increasing production, we believe a further assessment of the merits of a C–17 multiyear program may be warranted and can be accommodated under the current proposal.

BACKGROUND

The C–17 military transport, being produced for the Air Force by the McDonnell Douglas Corporation, is designed to airlift substantial payloads over long ranges without refueling. The Air Force intends the C–17 to be its core airlifter and the cornerstone of its future airlift force. Through fiscal year 1996, the Congress had appropriated about $20.5 billion for the C–17 program, including $5.9 billion for research and development, $14.6 billion for procurement, and $170 million for military construction. The Congress had approved the acquisition of 40 C–17s.

Multiyear procurement can benefit the government by saving money and improving contractor productivity through a more stable production run. A significant source of multiyear savings results from larger lot buys from vendors and suppliers, or economic order quantities (EOQ). However, multiyear procurement contracts decrease annual budget flexibility. If DOD's budget is reduced and multiyear contracts are maintained, those programs not under multiyear authority would have to be reduced disproportionately. A multiyear procurement contract also entails certain risks if it is changed or terminated.

The C–17 proposal is unique because it requests authority for a 7year multiyear contract. The current statutory limit is 5 years. In the past, it was ' not uncommon for multiyear candidates to request even shorter terms, such as 3 or 4 years. It is also unique because it is being proposed out of the normal authorization cycle and the offer expires on June 1, 1996.

The C–17 multiyear procurement proposal calls for an accelerated buy profile as shown in table 1.

TABLE 1.—C–17 MULTIYEAR PROPOSED BUY PROFILE

Fiscal year	1997	1998	1999	2000	2001	2002	2003
Number	8	9	13	15	15	15	5

It also calls for the Government to provide $300 million in EOQ funds beginning in 1996, to allow for the build up of inventory and for cost-reduction projects. The $300 million, which would be treated as a down payment to be recouped in subsequent years, is a combination of existing funds from a variety of sources from prior fiscal years as follows:

TABLE 2.—SOURCE OF ECONOMIC ORDER QUANTITY FUNDS

Fiscal year 1994 millions	Fiscal-year 1995 millions	Fiscal year 1996 millions
$70 NDAA[1] Funds 30 Lot VI OTP[2]	$50 Lot VII OTP 50 ECO[3] Funds	$100 Affordability Funds

[1] Non Developmental Airlift Aircraft.
[2] Over Target Protection.
[3] Engineering Change Order.

The multiyear contract has not yet been negotiated. However, Air Force officials told us that a multiyear contract would be based on the recently signed Lot VIII contract which contains fixed-price options for lots 9 through 11—30 aircraft. It also contains fixed price incentive/successive target options for the remaining lots covering the final 50 aircraft of the 120 aircraft buy. The Air Force must negotiate a separate firm fixed-price contract before exercising any of these options. Program officials told us that this arrangement gives them the flexibility to accommodate future uncertainties that could occur in such a lengthy procurement period.

Program officials also negotiated an extensive variation in quantity clause, which included an accelerated production schedule. However, this clause requires that once a production rate has been reached, it cannot be decreased, except for the final lot. Further, once the production rate has exceeded 12 aircraft, it must be increased to the maximum rate of 15 a year. If these conditions are not met, the remaining option prices are invalid and must be renegotiated. The multiyear contract will only include the accelerated schedule from Lot VIII. However, both Air Force and company officials told us that they intend to include a provision in the multiyear contract that would allow the government to revert back to the Lot VIII annual buy contract options without renegotiating those option prices, if neither of the above conditions have been violated. That means a decision would be required before approval of the fiscal year 1999 defense authorization and appropriation acts when the production rate is scheduled to reach 13 aircraft.

The multiyear offer is also contingent upon the use of performance based financing provisions. This is a departure from the normal 75- percent progress payment arrangement based on the amount of budget expended. It entails negotiating predetermined events and payments for each of the events for the remaining 80 aircraft. These include such events as major component completion, wing joining, roll out, and delivery. The contractor will receive financing based on the agreed to prices, which Air Force officials told us will include profit, after it has completed these events. The events have been identified; however, each event must still be defined as to what would constitute completion and the amount of financing that would be provided for completion of the event. Program officials told us that the effect of this financing arrangement is equivalent to a 90 percent progress payment rate.

C–17 MULTIYEAR PROPOSAL SAVINGS

In the past, the Congress generally required 10–12 percent savings from multiyear procurement. The C–17, at 5 percent, is at the low end of the spectrum when compared to other multiyear programs such as the KC–10, F–16, or B–1B, each of which estimated savings at 9 to 17 percent. Although savings could result from a multiyear procurement of the C–17, the claimed savings are overstated. The C17 multiyear procurement is estimated by the Air Force to save $896 million in then year dollars. The majority of this savings stems from two sources, the airframe and engine contracts. McDonnell Douglas has offered to reduce its contract price for the remaining 80 aircraft by 5 percent which the Air Force estimates to be about $760 million. The Air Force has estimated that it will achieve another $122 million (6 percent) savings from the Pratt & Whitney engine contract. In addition, the Air Force has estimated an additional $14 million in savings from other sources. An Air Force official were not able to identify the savings from "other sources."

Airframe Savings

Traditionally, a major portion of the savings from multiyear procurement comes from lower prices on economic order quantity buys from vendors or subcontractors. These savings are generally achieved with the EOQ money provided by the government. In this instance, however, McDonnell Douglas characterizes its offer of five percent savings as a "management challenge." In fact, its initial offer was closer to 3-percent. Program officials told us that McDonnell Douglas is still struggling to identify how it will use the EOQ funding.

A major part of McDonnell Douglas' effort to achieve the 5-percent savings will depend on its suppliers. It has given its key suppliers cost-reduction targets; however, according to Air Force officials, the supplier responses have been somewhat disappointing. McDonnell Douglas is still working with suppliers to try to achieve the overall 5-percent reduction.

Air Force officials told us that they expect that roughly $200 million of the EOQ funding will be applied to EOQ opportunities. The remainder may be used to fund affordability projects. The affordability projects which have been identified, are the group that could have been funded by the government with money appropriated from the C–17 Producibility Enhancement/Performance Improvement contract. These projects are estimated to have a 4 to 1 return ratio. That is, for a $100-million investment the return is estimated to be about $400 million. The resulting $300 million savings, although included as part of the multiyear savings, could be available without commitment to the multiyear.

Engine Savings

The F–117 engine contract is a commercial procurement where the government receives most favored customer pricing discounts. The multiyear offer from Pratt & Whitney would increase the discount by 4.3 percent. This represents a savings of $88 million, not $122 million as the Air Force had quoted in its multiyear package.

DESIGN AND PRODUCIBILITY CONCERNS

In approving a multiyear authority for the C–17, the Congress should be assured that the design is stable and can be produced at the designated rate. We have several concerns about the stability of the design and the inherent risk involved in increasing the production rate.

First, IOT&E was completed by the Air Force on December 5, 1995. Air Force officials indicated there were 95 open items from the IOT&E report that could impact the design of the C–17. Air Force officials told us that they are working on 47 of these items and they consider the remaining 48 to be inconsequential. They could not give us an.estimated cost or the time frames for implementing the production line changes needed to correct these items.

Second, the Air Force has also identified $1 billion in research and development funds, a large part of which, will be needed for future enhancements to the aircraft and an additional $1.8 billion in procurement funds: $275 million for engineering change orders (ECO), $308 million for product improvements, and $1.2 billion for modifications (retrofit) to mature the aircraft. The C–17 program office refers to ECOs as a management reserve to fund "unknown unknown". This money is estimated to cover any unforeseen problems which may occur through the production program. The additional funds are for improvements to the aircraft, many of which have not yet been identified.

Third, there are many outstanding variances from specifications that will have to be resolved. The Air Force plans to have these resolved by the scheduled delivery of production aircraft 33 in August 1997.

Our final concern is the extent of design and production changes that are taking place as a result of cost reduction efforts funded by the contractor under the C–17 settlement or by the government as cost reduction initiatives. These projects were initiated to reduce costs on the C–17 in preparation for the November 1995 DAB. if difficulties occur in implementing these changes, price or schedule problems could result which would be exacerbated if the contractor is at the same time increasing production.

REQUIREMENT STABILITY

The decision to acquire 120 C–17's was the result of a Defense Acquisition Board (DAB) that considered whether to acquire additional C–17's or a mix of C–17's and non-developmental aircraft to accomplish the airlift mission. The analysis leading up to that decision included several predetermined options presented for consideration by the DAB. Our analysis indicates that an option of 100 C–17s could meet the current strategic mobility requirement and also fulfill the need for aircraft with the unique military capabilities of the C–17. That option was not presented to the DAB for consideration. The possible savings from this alternative would be significant.

FUNDING STABILITY

The multiyear justification package states that funding for the proposed multiyear buy has been included in the Future Years Defense Plan and the fiscal year 1997 budget, and airlift modernization is a well recognized priority for DOD. At this point in time, we have no specific basis to question future funding stability.

CONCLUSION

The proposed C–17 Multiyear contract presents the Air Force with the opportunity for savings on the C–17 program. However, the savings are, in our opinion, substantially less than the $896 million that has been advertised. Further, these potential savings are not without both costs and risk. The contractor has asked for EOQ funding of $300 million. In our opinion this should be viewed as $200 million of new funding and $100 million of funds that would most probably have been provided to fund cost reduction initiatives. The contractor has also asked for an event based financing arrangement that will provide a 90 percent equivalent progress payment structure rather than the usual 75 percent included in production contracts. In both instances there is a cost of money to the government that would not exist under annual buy.

There are also risks associated with approving multiyear authority. These risks concern the extent of stability in the design and the potential for problems in implementing the producibility enhancement projects that may create cost and schedule problems.

In our opinion the Congress should require that a provision which would allow reverting to the Lot VIII annual buy contract is included in any multiyear contract. With that provision the government would have until the fiscal year 1999 authorization and appropriation cycle to assess the contractor's ability to produce the aircraft at the required rate. If the contractor's performance is not adequate, the government could revert to the Lot VIII annual buy contract without renegotiating the not-to-exceed option prices for the remaining lots.

The Congress should require the Department to provide assurances along with its 1999 budget request that the contractor is in actuality ready to move to the higher production rate.

Mr. Chairman, this concludes my prepared remarks. I would be pleased to answer any questions you or members of the subcommittee may have.

Senator COHEN. Thank you, Mr. Rodrigues. Dr. Kaminski.

STATEMENT OF PAUL G. KAMINSKI, UNDER SECRETARY OF DEFENSE FOR ACQUISITION AND TECHNOLOGY

Dr. KAMINSKI. Thank you, Mr. Chairman.

Thank you very much for the opportunity to appear today to discuss our proposed multiyear procurement plans for one of the Department's most important priorities, the C–17 Globemaster III aircraft. This multiyear procurement request is important to the Department, to the Nation and the American taxpayer. For this reason, I am especially pleased to appear before you today. I am also pleased to be here, because this hearing attests to the equal importance that you, Mr. Chairman, and the members of this subcommittee, as well as the full authorization committee and the Congress, attach to this request—quite appropriately so.

I sincerely believe that we have a good-news story here, one that leverages a billion dollars of procurement funding. It is a part of a larger strategic and tactical mobility success story, one that the Congress in general, and this committee in particular, has helped the Department and our industry team achieve. With your strong support and direction, we have together worked diligently to develop a sound program to modernize our airlift fleet.

Mr. Chairman, I think this program is being managed today in a manner that David Packard would be proud of. As you know, Mr. Packard, who passed away yesterday, served as Deputy Secretary of Defense and chairman of the Packard Commission, and provided many recommendations for acquisition reform. He advocated principles of program management derived from his experience as chairman and CEO of Hewlett-Packard, and we are applying those principles today. I hope you will join me in recognizing the many contributions of this fine American.

With your permission, Mr. Chairman, I would like to place my written statement in the record and, when you are ready, proceed with an oral statement using a few graphs.

Senator COHEN. You would then proceed with questions, or are you prepared to go forward with the graphs now?

Dr. KAMINSKI. I am prepared to go forward with the graphs now.

Senator COHEN. Before you do so, I would like to yield to the chairman of the committee for a statement he would like to make.

STATEMENT OF SENATOR STROM THURMOND

Chairman THURMOND. Thank you very much, Mr. Chairman.

Mr. Chairman, I want to commend you for holding this hearing on the C–17. The armed services committee has strongly supported the C–17 program, both in this matter and in the past when the program was in trouble.

The issue before us today, the McDonnell Douglas proposal for a 7-year multiyear procurement authority, deserves the careful consideration that you and your subcommittee have given it. The obligation of the Government to a 7-year program must be carefully weighed against any proposed savings in the future. It is essential that the armed services committee has the opportunity to consider such a long-term commitment of this magnitude.

The proposal, as I understand it, is for a 7-year obligation in exchange for a 5 percent savings, with a deadline of the 1st of June for the offer. Before rushing into any such commitment, we need to understand the details and reasoning behind the proposal, as well as the rationale for hasty action without authorizing language from this committee.

I applaud the fine work of the men and women who build the C–17, and those who operate it. It has been a success story since the armed services committee took the risky position of supporting the settlement negotiated between the Department of Defense and McDonnell Douglas in 1994. It has been gratifying to see the fine achievements of the C–17 in recent weeks in Bosnia. But before we make such a substantial commitment, we must understand the detail, weigh the alternatives, and be certain that all options have been considered carefully before moving ahead.

Again, Mr. Chairman, I appreciate the fine work you and your subcommittee are doing for the committee in this very important matter. I have a question I would like to ask of each of the three witnesses.

Mr. Rodrigues.

Mr. RODRIGUES. Yes, Mr. Chairman.

Chairman THURMOND. The proposal before the subcommittee includes a 5 percent savings over 7 years and has been submitted out of the normal authorization cycle. Do you know of any previous situations similar to this or have any comparisons you could make to put this situation in perspective?

Mr. RODRIGUES. Mr. Chairman, no, I am not aware of any that came out of cycle like this. I am not aware of any programs with a multiyear procurement that came out of cycle like this. In this particular instance, the estimate of the program that existed prior to the settlement agreement, that total program estimate of $43 billion was based around, in fact, including a multiyear. So it is kind of interesting that we go into a DAB process and decide to go on past that, and yet the DAB process did not have the multiyear included in there. It does seem to be unusual, sir.

Chairman THURMOND. Mr. Kozlowski, the armed service committee fought hard for approval of the settlement agreement negotiated between your company and the Department of Defense. What have been the effects of that settlement agreement with respect to the production of C–17's?

Mr. Kozlowski: Mr. Chairman, first, let me say I am very appreciative of both you and the subcommittee on behalf of the pioneering efforts to support that settlement. It was essentially the turnkey that started the turnaround on the C–17. In short, what the omnibus agreement precipitated was modernizing the production line and modernizing the design side of the house, bringing it into the 20th Century. As you will hear in our testimony today, we have taken roughly 40 percent of the cost out from what you are paying today to what you will be paying in the future.

So it was a major stepping stone, and it is the key to the success of the C–17.

Chairman THURMOND. Dr. Kaminski, I amended the Omnibus Appropriation Act to ensure this committee would have an opportunity to review the C–17 multiyear procurement proposal. Do you agree that this committee has an important role to play in any proposal of this magnitude?

Dr. KAMINSKI. Senator Thurmond, I certainly do agree. This is a critical program, which this committee has been involved with now over the past 2 years, from the settlement agreement going forward. This multiyear program is a substantial proposal, with a very substantial financial commitment. I welcome very strongly the committee's interest in pursuing and understanding the basis for this multiyear procurement, and giving it special and careful consideration in its deliberations.

Chairman THURMOND. The authorization committee has important functions to perform. If there is a shortcut that eliminates this committee passing on these matters, is that not detrimental to the country? Any of you can answer that if you want to.

Dr. KAMINSKI. Senator Thurmond, I see no reason for there to be any shortcut approach which does not allow this committee to have a full review of this matter. I think it is constructive and necessary for this to happen.

Chairman THURMOND. We have a strong national defense, and we want to continue to have one, but we do not want this committee sidestepped in any such matter. Thank you all very much.

Thank you, Mr. Chairman.

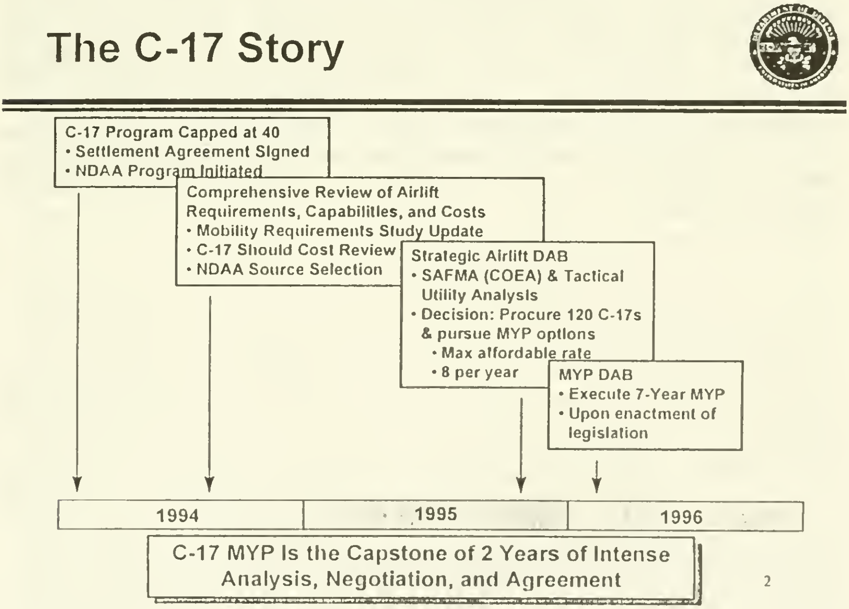
Senator COHEN. Thank you, Mr. Chairman.

Dr. Kaminski, as you proceed to your presentation of the charts, I would like to have you, if you could in your remarks, address the GAO's observations about this being a very vague offer, that there has been an insufficient explanation of how the $300 million of the EOQ money would be used, that you define the so-called bridge back to the future, as such, and what happens as we fall below or exceed a certain production rate, and explain why this is such a great deal getting 5 percent versus, in the past on multiyear procurements for KC–10's, F–16's, B–1B's, the multiyear procurement produced between 9 and 12 percent savings to the Government. So if you could, as you are making your presentation, respond to that.

Dr. KAMINSKI. Let me undertake to do that, Mr. Chairman.

Yesterday, in preparation for this hearing, I spoke with the chairman of the Joint Chiefs, General Shalikashvili. He told me in that session, as well as told Secretary Perry, that his number-one priority with respect to strategic airlift is the C–17 multiyear procurement that I will be describing to you, in terms of it being the best opportunity to meet our military needs at the most affordable price.

If I may have the first chart, please. [Chart.]



The C-17 Story

C-17 Program Capped at 40
- Settlement Agreement Signed
- NDAA Program Initiated

Comprehensive Review of Airlift Requirements, Capabilities, and Costs
- Mobility Requirements Study Update
- C-17 Should Cost Review
- NDAA Source Selection

Strategic Airlift DAB
- SAFMA (COEA) & Tactical Utility Analysis
- Decision: Procure 120 C-17s & pursue MYP options
  - Max affordable rate
  - 8 per year

MYP DAB
- Execute 7-Year MYP
- Upon enactment of legislation

C-17 MYP Is the Capstone of 2 Years of Intense Analysis, Negotiation, and Agreement

Dr. KAMINSKI. In early November of last year, I chaired the Defense Acquisition Board review of the C–17 program and the nondevelopmental airlift aircraft, the NDAA alternative, as well. This Defense Acquisition Board meeting was the culmination of a 2-year probationary period that my predecessor had instituted. In the past 2 years, McDonnell Douglas and the Air Force undertook a massive effort at restructuring and reorganizing this program, with the aim of reducing cost, improving performance and increasing quality.

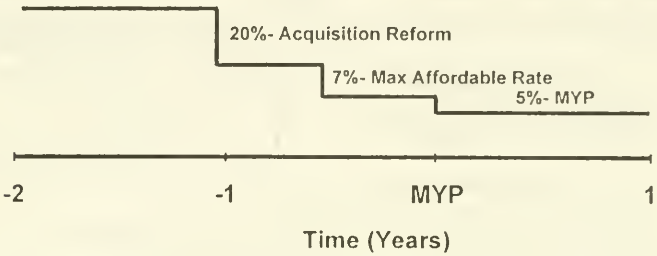
The result of that effort: we saw the unit price of the C–17 come down substantially, no doubt spurred on by the competition with the NDAA alternative. We saw quality markedly improve. We saw early deliveries of aircraft to the operational user begin at that time, and continue since then unabated.

If I pick as a snapshot here the period of that DAB in November of 1995, at that time, we had the completion of a strategic airlift force mix analysis and a tactical utility analysis. Based on all of those inputs and the members of the DAB, I decided to recommend to the Secretary procurement of 120 C–17's.

I was presented with a multiyear option at that point, which I had requested earlier, but I was not satisfied with the terms of that multiyear program. Therefore, I requested the Air Force, in my acquisition decision memorandum, to go back and present to me a multiyear procurement option under two conditions. One, under the procurement rate of 8 aircraft per year and the other at the so-called max affordable rate. As soon as that multiyear proposal was available, I was prepared to schedule a follow-on DAB to focus on the multiyear issue.

That multiyear DAB happened during one of the snow weeks in early January of 1996. At that point, I received a proposal for a 7-year multiyear program. I was not yet satisfied with all the terms of that arrangement, so I sent the Air Force program manager back to undergo some further negotiations. When that proposal was brought back to me, which was about 3 weeks later, I approved the program to proceed with a multiyear program, to begin to close those negotiations, and to define the final terms of the multiyear program. [Chart.]

C-17 Cost Reduction Track



Significant C-17 Cost Savings Prior to MYP

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Dr. KAMINSKI. This describes the cost-reduction track of the C–17. The curve starts right here, with an estimate based on a should-cost analysis. We and the contractor developed a common cost model. What we were doing was using the trend line of our cost experience on the program, not accounting for any of the acquisition reform improvements or the investments to be made in improving productivity and the production processes. Starting with that as a baseline, our combination of acquisition reform initiatives and investments in productivity improvement resulted in a 20 percent cost-reduction in the program.

The next piece of this, moving from the 8 per year to the maximum affordable rate, accounted for another 7-percent reduction of the cost. Mr. Chairman, if you bear with me, I will show you this in absolute terms in the next chart.

Then, from this base, the multiyear proposal we are presenting and recommending to you results in another 5-percent cost reduction. Mr. Chairman, you asked the question about how this 5 percent compares with other rates in programs. I think the issue here depends upon the base that you started from to put the 5 percent in the proper perspective. That is, in past multiyear programs, there was some combing of the savings associated with maximum affordable rate and other activities. The base that we are operating from today has already been reduced by 27—20 percent for acquisition reform actions that we have implemented and 7 percent for going to a maximum affordable rate profile—so this additional 5-percent cost reduction is a very aggressive reduction.

This will be a challenge for us collectively to achieve. We do not believe this is on the thin side, in terms of the savings that are provided. Especially we do not believe this is on the thin side in absolute terms, when this amounts to $896 million over the life of this program. Those are funds that will be critical to us to plow back into our modernization program. [Chart.]

C-17 Cost Reductions

	$ Billions*		
Baseline Price for Last 88 C-17s	23.5		
		$4.4B	Acquisition Reform Cost Reduction Initiatives NDAA Competition
Price After Cost Reduction Initiatives and Negotiations Leading to Nov 95 DAB	18.3		
		$1.2B	Max Affordable Rate
Revised Production Rate to Maximum Affordable	17.1		
		$0.8B	Aircraft MYP
Multi-Year Procurement Savings for Last 80 C-17s	16.3		
		$0.1B	Engine MYP
		$6.5B	Total Savings

*Cost of 88 C-17s w/o Engines

Dr. KAMINSKI. This next chart, Mr. Chairman, shows these results in absolute terms. Using this should-cost baseline for the C–17, we started here at $23.5 billion. Let me indicate, when one tries to make apples-to-apples comparison, this does not include all costs in the program. This does not include, for example, the cost of engines. It does not include discretionary funds in the program for modifications to the tune of about $2 billion.

I started with this should-cost baseline so we can do an apples-to-apples comparison down the chart. The reduction from $23.5 billion to $18.3 billion includes some changes in requirements, the combination of our acquisition reform initiatives, the cost reduction due to competition, and productivity improvements. Of that roughly $5.2-billion reduction, we credit $4.4 billion of that to the acquisition reform and productivity improvement pieces of it. The remainder is attributed to requirement changes.

As we move to the maximum affordable rate, the 7-percent reduction results in additional savings of $1.2 billion. That is the rate adjustment. Then, on top of that, the multiyear program produces over $800 million for the aircraft and a little under another $100 million for the engines. This adds up to a total of about $6.5 billion of savings.

The issue as to whether the savings are enough from the multiyear comes back to the fact that it is on top of the other adjustments to the program baseline. This combination, in my opinion, does represent a very aggressive program and it represents very substantial savings for the Department of Defense.

Senator COHEN. Can I ask you, are you using $300 million from prior-year savings to go with the cost-reduction?

Dr. KAMINSKI. We will be using that in the multiyear. Mr. Chairman, if I may, I will explain that on the next charts, as to how that goes in and how it comes back out. [Chart.]

Aircraft MYP Offer

Contractor provides 5% price discount

- Additional discount from negotiated Firm Fixed Price contracts
  - 20% price reduction already achieved through aggressive cost reduction efforts
  - 7% price reduction for 80 C-17s at maximum affordable rate (FY97-03: 8-9-13-15-15-15-5)
- MDA accepts management risk to achieve additional 5% savings starting w/ FY97
- 7 years
- Event based payments being negotiated
- Offer valid until 1 Jun 96
- Cancellation penalty if full 120 not purchased

Dr. KAMINSKI. But we are accounting for that in the savings. That is, the savings are net, after the use of those funds, rather than gross.

This is the multiyear procurement offer that we are proposing to you. Just to make this a straightforward discussion, basically, what we are talking about here is a commitment not just to the next aircraft, not just to the next 8 aircraft, but to the next 80 aircraft over a period of years. So we are looking at a down payment on a program to make a commitment to, in essence, buy a lot of 80 on a predetermined profile.

Buying in this long-term sense provides the 5 percent price discount I described. It is on top of the 20 percent price reduction already achieved from implementation of acquisition reforms, and the 7-percent price reduction due to rate. McDonnell Douglas is willing to accept the management risk—and we believe this will take considerable effort to achieve—to provide an additional 5-percent savings, starting with the fiscal year 1997 program. It is on the assumption that the EOQ funds—the $300 million that I will come to in a minute—are obtained in June of this year.

This is an unusual request, because it breaks with precedent in two senses: it is a 7-year multiyear, and we are asking for approval out of cycle, earlier than the fiscal year 1997 legislative cycle. We are doing this because of the opportunity that presents itself today, in terms of being able to move forward with the negotiations that are required, not only with McDonnell Douglas, but with the first-, second- and third-tier suppliers, which take time to put into place.

This offer is also based upon an event-based payment schedule that is not finally negotiated. This is one of the issues that I had asked the Air Force to go back to the contractor on in January in the first DAB multiyear meeting, to improve the terms for the MYP. That in fact is being done. There has been some improvement in terms, but this is not finalized at this point.

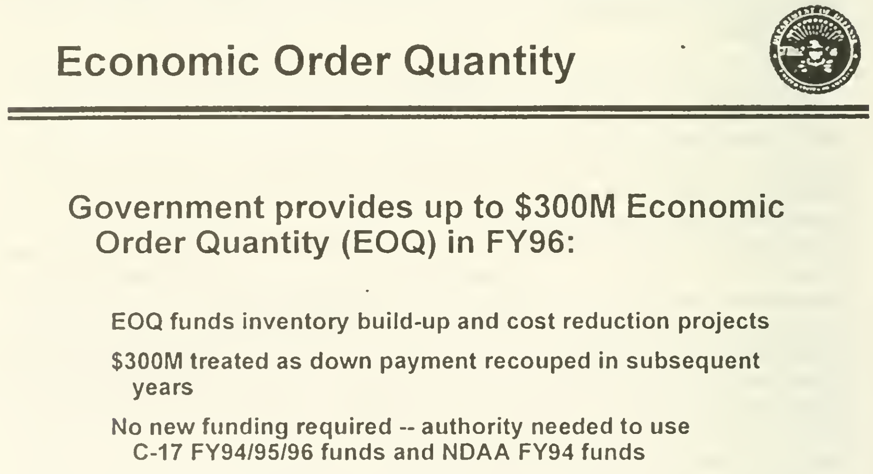
This basic offer is valid until the 1st of June. This was determined by what is required to propagate this negotiation down to the whole supplier base, to receive firm commitments from the suppliers for this order of 80 aircraft, vice 8 aircraft. There is, in a sense, a cancellation penalty here associated with the economic order quantity funds, the $300 million, Mr. Chairman, that you referred to. It is not a specific cancellation penalty, but it is a penalty that works as follows.

With the down payment of $300 million, we will be making a commitment to buy out all the piece parts associated with 80 additional aircraft, having already committed to 40. So, to the extent we do not buy out that entire lot, what we will do is end up having to liquidate what components are left. Those which are not used, we will be stuck with the bill for.

So that is the form of the cancellation penalty that results. It is to the extent we buy less than 120 aircraft, we will have been committed to parts or components for that full lot. We will be paying the penalty of not being able to use those parts productively.

Senator COHEN. What is the penalty for the contractor if they do not achieve a 5-percent discount?

Dr. KAMINSKI. The penalty will be a loss of profit. [Chart.]



Economic Order Quantity

Government provides up to $300M Economic Order Quantity (EOQ) in FY96:

EOQ funds inventory build-up and cost reduction projects

$300M treated as down payment recouped in subsequent years

No new funding required -- authority needed to use C-17 FY94/95/96 funds and NDAA FY94 funds

Dr. KAMINSKI. Let me explain, Mr. Chairman, this issue of economic order quantity. The way I think of this is the down payment on the buy of 80 aircraft. In this situation, we will make an up-front payment of $300 million.

Senator COHEN. Where do you get the money, by the way? What are the sources of that money?

Dr. KAMINSKI. There are three sources of this money, Mr. Chairman. One is that we were budgeting for this program above our target costs, because our experience in the past was that we were not achieving our target costs. We are now achieving our target costs, so the excess that we had budgeted as a contingency above our target costs is available.

Senator COHEN. You have not been talking to NRO, have you? [Laughter.]

Dr. KAMINSKI. Mr. Chairman, that is the type of hit I like to take for us moving forward and getting this program under our target costs. Our experience before this had been the otherwise. So good management and performance by the contractor team and the Government I think has given us that plus.

Senator COHEN. That accounts for the full $300 million?

Dr. KAMINSKI. No, sir. Let me get you the exact figures. There are three components of this. Another piece comes from the NDAA program, which we are not executing now because we have committed to the C–17. The third piece of this comes from funds that we had already had appropriated for cost reduction.

The numbers that go with those, Mr. Chairman, are termination of the NDAA program has provided $75 million in fiscal year 1994; $75 million in fiscal year 1996 funds were appropriated for cost-reduction activities which can now be applied to this EOQ; and the balance comes from the better program performance I referred to in causing us no longer to have to budget above our target costs in fiscal years 1994 and 1995.

As I said, Mr. Chairman, these funds are a down payment, which will result in savings during the subsequent years as we buy out the line. No new funding is required for the reasons I just stated, in terms of where the $300 million comes from in prior years, going back to fiscal year 1994. [Chart.]

Engine MYP Offer

- 7-year MYP starting in FY97
- Discount comparable to aircraft MYP
  - Estimated average savings 6.5%-- in negotiations
  - “Back-loaded”
- No EOQ required
- No cancellation penalty

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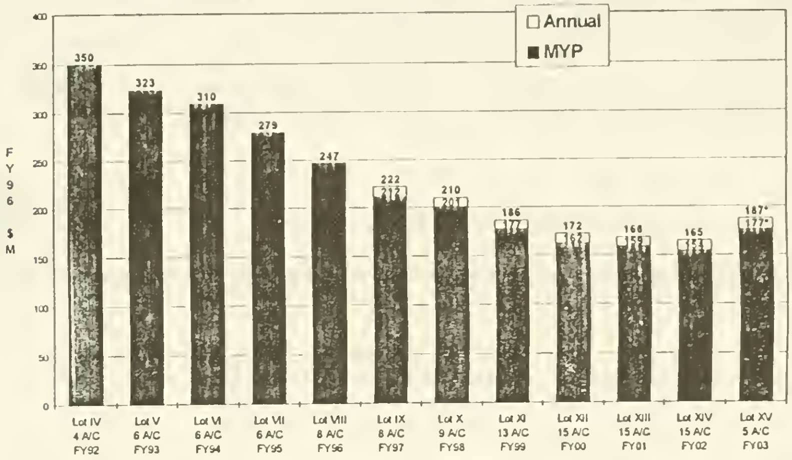
Dr. KAMINSKI. There is also a multiyear program for the engine. This is a 7-year multiyear program. This is being done on a commercial basis. This was a commercial engine, developed commercially. What we are doing here is getting a quantity discount. Our expectation—and this is still in final negotiations—is that we will be able to achieve a savings of 6.5 percent. There is no EOQ required here, because this is on a commercial basis, although we would be willing to consider an EOQ were we able to get better terms as result. While we are still in negotiations, there is currently no cancellation arrangement associated with the engine multiyear program. [Chart.]

C-17 Unit Flyaway Price



* Assumes no FMS or commercial sales to extend production

Dr. KAMINSKI. Mr. Chairman, this shows the cost history of the C–17 program. Something that was enabled—achieving this cost profile was enabled by your support, as discussed earlier with Chairman Thurmond. As a result, looking at where we were in Lot 4 to where we expect to end up through the multiyear is seeing the unit flyaway price of this airplane basically reduced in half from where it was in Lot 4 in fiscal year 1992, to where we would expect it to be with the procurement of 15 aircraft in Lot 12 at the turn of the century.

Mr. Chairman, you asked about penalties associated with adjustments of rates and the like. Our analysis of this proposal looked at two different issues. One, the worst-case assumption that said for some reason we would decide to buy less than 120 C–17's and suffer the cancellation associated with the inability to use the EOQ funds or, that is, the inability to use the components that they bought, what we find is that we are better off with this multiyear program than we would be otherwise, so long as we continue our buys through fiscal year 2000. That would result in a buy of about 85 aircraft. So long as we buy that many through that year, we will be better off on this proposal than we would be on a year-by-year proposal.

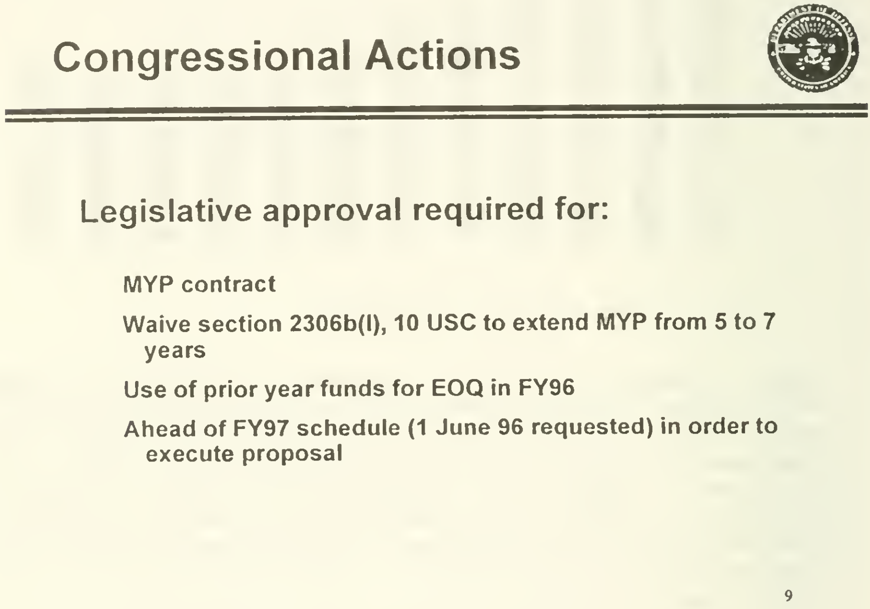
Let me say that again. We would be better off on this proposal, should we choose to buy less than 120 total aircraft, so long as we decide to do that after fiscal year 2000. We would be better off on those terms than we would be on a year-by-year buy.

Senator COHEN. Would you explain the distinction between Mr. Rodrigues' statement about fiscal year 1999 as being a critical departure point? That is the point, as I understand it, of the proposed buy. The last time we will be down to 13. I think the year 2000 is up to 15. At that point, we lose the ability to buy back in at the lower rate.

Dr. KAMINSKI. I think, Mr. Chairman, his issue was more the rate of production issue. I was first giving you the worst case on total number buy. This is the worst-case proposition.

The second one is what would happen if we changed the rate of buying. Under that arrangement, our analysis shows that so long as we keep the current rate through fiscal year 1998, this multiyear proposal would be better than a year-by-year.

Senator COHEN. OK. [Chart.]



Congressional Actions

Legislative approval required for:

- MYP contract
- Waive section 2306b(l), 10 USC to extend MYP from 5 to 7 years
- Use of prior year funds for EOQ in FY96
- Ahead of FY97 schedule (1 June 96 requested) in order to execute proposal

Dr. KAMINSKI. Mr. Chairman, this is our request to you. We are asking for legislative approval for this multiyear contract for waiver of Section 2306(b) of 10 U.S. Code to extend this multiyear from a typical 5-year program to a 7-year program, and for the use of these prior-year funds, going back to fiscal years 1994 and 1995, to make up this $300-million requirement for the EOQ in fiscal year 1996.

We are also asking for your approval to proceed ahead of the fiscal year 1997 normal schedule, a request for approval by the 1st of June if possible, in order to fully execute this proposal and have it impact the full remaining 80 aircraft in this program.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Kaminski follows:]

PREPARED STATEMENT BY HON. PAUL G. KAMINSKI

Mr. Chairman, members of the subcommittee, thank you for the opportunity to appear today to discuss our proposed multi-year procurement plans for one of the Department's most important priorities the C–17 Globemaster III airlifter. With your strong support and direction, we have worked diligently to make strategic mobility improvements. The C–17 is helping us make tangible gains in mobility right now. This aircraft is indeed earning its reputation as the world's most versatile and capable airlifter.

As you know, in early November 1995, I chaired a Defense Acquisition Board (DAB) review of the C–17 program and the Non-Developmental Airlift Aircraft (NDAA) alternative. This DAB was the culmination of the 2-year probationary period that my predecessor instituted. In the past 2 years, McDonnell Douglas and the Air Force undertook a massive effort at restructuring and reorganizing the program, with the aim of reducing cost, improving performance, and increasing quality. The result? We saw the unit price of C–17s come down substantially, no doubt spurred on by the competition with the NDAA. We saw quality markedly improve. We saw early deliveries of aircraft to the operational user start and continue unabated to date.

But that was not enough. To gauge the progress of these efforts against stated requirements, several extraordinarily detailed analyses were presented to the DAB. The Cost and Operational Effectiveness Analysis (COEA), known as the Strategic Airlift Force Mix Analysis, perhaps the most detailed strategic airlift analysis in history, showed that there was no question that a substantial number of C–17s beyond 40 were required. Another, called the Tactical Utility Analysis, examined the utility of the C–17 in scenarios other than strategic airlift in Major Regional Contingencies (MRCs), such as intra-theater airlift, airdrop, and lesser regional contingencies. It showed that the C–17 brought operational commanders and the Nation important new capabilities and increased flexibility in the changing world situation.

When we carefully analyzed the effect of small changes to the analytical assumptions, it confirmed that the C–17 was the most robust alternative in responding to the expected range of operational conditions. Finally, the C–17's affordable life cycle price, which was less than one percent higher than the equivalent mixed fleet, made it clear that an additional 80 C–17s was the right choice for the Department and the taxpayer. In what way? Allow me to illustrate.

For example, during Operation Joint Endeavor, when it became clear that due to weather, diplomatic constraints, and sheer volume (the railways and roadways were backed up) C–17s were used to haul outsized cargo, like howitzers and Bradley Fighting Vehicles, directly to Tuzla, Bosnia. When we discovered that it was either impossible or impractical to move critically needed, outsized bridging equipment via the roads or rail, we flew it in on the C–17. Let me point out that no one ever envisioned or modeled the ability of the C–17 to carry bridging equipment on flatbed trucks so that it could be driven right to a flooded river. But when the real-world need arose, the C–17 was ready. I attribute this airlifter's extraordinary ability to handle real-world challenges to the inherent flexibility and military utility designed into the C–17. I am certain we will hear many more accounts—like the missions flown in support of the Sava River bridging operation as users learn new ways of employing this impressive capability.

The statistics compiled during the Operation Joint Endeavor deployment were impressive. C–17s flew a quarter of the airlift missions, yet moved about half of the cargo. These aircraft, operational only for a year, maintained a departure reliability rate of 97 percent in the stress of a real-world operations. Also, the ability to use small austere airfields enabled the C–17 to operate effectively at Tuzla, where the C–5 could not. Although C–130s could operate at such smaller fields, each C–17 into Tuzla could deliver the equivalent of four average C–130 loads—that is getting combat power where you need it, fast. These are just a few of the many examples of how the results of our analyses and the Department's C–17 decision are being borne out in the real world.

You are no doubt aware that the warfighting CINCs identify strategic lift as Department's greatest single deficiency. They unanimously identified the C–17 as having highly preferable capabilities that give them the type of crucial operational flexibility just described. With its ability to operate from small airfields and in hostile environments, to deliver oversize and outsize cargo wherever we need it, the C–17 is an essential resource for our warfighters.

REQUIREMENT

General Shalikashvili firmly supports the C–17 requirement. Quoting from testimony before the House Appropriations Committee on March 7, 1996, he said ". . . we must continue to improve our strategic lift. I think that we are making good progress in improving our airlift and . . . we must pass the multi-year procurement for the C–17." He has told the Secretary of Defense that his *number one priority* with respect to strategic airlift is the C–17 multi-year procurement because it offers the best opportunity to meet military needs at the most affordable price.

The C–17 program has a stable requirement. The total requirement is 120 C–17s and is based on detailed analyses. This C–17 procurement requirement is expected to remain unchanged in terms of production rate, fiscal year phasing, and total quantity. There are some who would argue against a multi-year procurement (MYP) now—just wait a little longer until requirements are re-examined, they say, and maybe you will not need 120 C–17s. In my judgment, with a well-documented need for lift, additional waiting is not warranted.

Nonetheless, I asked for an analysis of the MYP proposal to assess the impact of requirements changes. The analysis shows that even if we have to break the multi-year buy and stretch out the procurement of the 120 aircraft buy, this multi-year approach still saves money so long as we do not reduce the planned rate until after fiscal year 1998. If we buy fewer than 120, this multi-year approach saves money so long as we do not cancel orders until after fiscal year 2000. In that time we will buy 45 more C–17s for a total of 85 aircraft. We clearly need more than 85 C–17s, so any fear that we are tied into a deal that restricts our maneuver room is unfounded.

The C–17 program has stable funding. It is one of the Department's top, near-term modernization priorities. The budget necessary to execute the proposed program has already been programmed through and beyond the Future Years Defense Program (FYDP) and in the fiscal year 1997 President's Budget. The Department is committed to fund the program at the required level to ensure the contract is completed.

The C–17 configuration is technically mature. The C–17's excellent performance during operations in Bosnia attests to that. The developmental and initial operational test programs are complete, and the aircraft now has fourteen months of operational experience. The configuration was baselined with the eighth production lot, and the proposed multi-year purchase begins with the ninth lot.

MULTI-YEAR REQUEST

Mr. Chairman, allow me to take a moment to review the C–17 program to help you better understand why the Department believes a multi-year procurement is in our interests. As you are acutely aware, not very long ago this program was in big trouble. With your help, we have made great strides in turning this program into one we all can be proud of. Since the comprehensive settlement was approved by the Congress, and thanks to a variety of cost reduction initiatives, we have already cut the unit price nearly in half.

The price of the first 40 C–17 aircraft, in constant fiscal year 1996 dollars, was an average of $338 million per copy. With the maximum affordable rate change and the proposed multi-year procurement, we will bring the average price down to $173 million (in constant fiscal year 1996 dollars). Simultaneously, we have seen the quality of delivered aircraft steadily improve. In a nutshell, the aircraft is demonstrating that it is reliable, extraordinarily capable, and cost-effective.

We are now requesting legislative approval for the C–17 multi-year procurement. I believe the program meets the criteria for such a procurement, and it constitutes what I think is a sound business decision. Multi-year contracting is important to the Department because it leverages our available procurement funds. We get more rubber on the ramp for the same investment when we use multi-year contracting.

Savings and Cost Avoidance

The proposed multi-year contract will save the Government approximately $896 million over the best prices available by contracting in annual increments for the same 80 aircraft at the same production rate. Next to the B–1 program, this will be the largest multi-year related cost avoidance in the Department's history. This provides funds that will be used to bolster other critical modernization efforts. It is also important to remember that the additional 5 percent savings comes on top of the substantial cost reductions achieved in our long-term, fixed price buyout strategy already in place, which reduced prices 27 percent. The last seven percent of this reduction was associated with maximum affordable rate efficiencies. Additionally, the 5 percent reduction figure is based upon actual, negotiated contracts, and not upon estimates or proposals, so I am confident these are real savings. When taken in context of the C–17's previous price reductions, in particular the seven percent reduction for rate efficiencies, the further five percent reduction is a good deal for the Department and the Nation.

Impact on Industrial Base

A multi-year contract will foster a stable environment in which the C–17 industrial base can grow stronger. As a result, we believe the major and critical subcontractors will be able to build components at, or near, commercial prices. Through multi-year contracting, it becomes affordable to qualify dual sources for critical lower-tier suppliers, increasing competition and reducing risk. Of course, the long-term commitment permits better planning for capital investments, and more efficient production of economic lot quantities. This alone is likely to help the many small suppliers, by allowing them to make cost-effective decisions on a longer-term basis.

IMPLEMENTATION

To arrive at this multi-year proposal, we conducted an extensive and cooperative "Should Cost" review. We developed a joint contractor-Government cost and pricing model that was based on actual data for the 25 aircraft produced to date. We also negotiated a fixed price contract with fixed price options (containing adjustment clauses) for 120 C–17s.

In preparing this proposal for delivery to the Congress, we should have better laid the basis for the June 1996 approval need date first. We presented and discussed legislative options with all four Defense oversight committees, and found that there were limited legislative vehicles that would meet the June 1996 date. It is clear to us that there is a window of opportunity that behooves us to act by June 1996, rather than later in the fall when the fiscal year 1997 budget cycle is expected to be completed. The majority of savings will be captured when McDonnell Douglas can negotiate with its suppliers on a long-term basis. For example, to meet the fiscal year 1997 aircraft delivery schedule for Lot 9, or aircraft 41–48, McDonnell Douglas must negotiate and activate 50 percent of its subcontracts with first-tier suppliers and vendors by June 1, 1996. Since more than 60 percent of the C–17 is built by suppliers and vendors, a significant portion of the multi-year savings are tied to economic order quantity (EOQ) efficiencies realized by first-, second-, third-, and in many cases, fourth-tier suppliers.

For a significant delay beyond June 1996, EOQ-funded producibility enhancements will benefit fewer C–17s. Without multi-year approval, McDonnell Douglas will be forced to negotiate contracts for the eight aircraft in Lot 9 during the summer of 1996. With multi-year contracting approval, McDonnell Douglas could negotiate prices for 80 aircraft. There is a substantial amount of savings, on the order of $500 million, in that ten-fold increase in production quantity. If we miss Lot 9, ten percent of the remaining C–17 production run will not benefit from EOQ efficiencies.

If we wait until the fiscal year 1997 budget cycle is complete, we could delay EOQ purchases and producibility enhancements to Lot 10 or beyond. In this case, 21 percent of the remaining C–17 production would not benefit from EOQ purchases. We would also erode the confidence of vendors and suppliers that a multi-year procurement would ever come to pass. This would cause vendors to be more conservative and would lead to protracted contracted negotiations and further delays in realizing EOQ savings.

SUMMARY

In conclusion, I welcome this opportunity to appear before the subcommittee today. The Department is requesting legislative approval for: (1) a multi-year procurement contract; (2) a waiver of section 2306b(1), 10 USC to extend the multi-year procurement duration from 5 to 7 years; and (3) use of prior-year funds for the Economic Order Quantity (EOQ) purchase in fiscal year 1996. We are seeking approval ahead of the fiscal year 1997 budget cycle (June 1, 1996 requested) in order to execute the MYP proposal.

I sincerely believe this is a good news story—one that leverages more than a billion dollars in procurement funding. The C–17 MYP offer on the table is a good one. I believe that the C–17, thanks to the efforts of the Congress, the Department of Defense, the Air Force, and McDonnell Douglas, is proving itself to be worth the commitment.

Senator COHEN. Thank you, Dr. Kaminski. Mr. Kozlowski.

STATEMENT OF DONALD R. KOZLOWSKI, SENIOR VICE PRESIDENT, MILITARY TRANSPORT AIRCRAFT, MCDONNELL DOUGLAS CORPORATION

Mr. KOZLOWSKI. Thank you, Mr. Chairman. Again, let me say that, as a taxpayer and as an individual, I am personally very appreciative of your support from the omnibus agreement, all the way up to the current day. I am also very impressed every time I come to Washington and see this magnificent process work.

Senator COHEN. That may be setting a precedent. [Laughter.]

Mr. KOZLOWSKI. I submitted a statement for the record, but I would like to elaborate on some specifics, addressing some of your questions with some facts which may be helpful here because they address the efficacy of the multiyear program. First of all, relative to program status:

Historically, we built one test aircraft, two test articles and we have completed 24 production aircraft deliveries. The static tests are complete, and that article probably soon will be torn down. The durability test article is at two-and-a-half lifetimes. That is very significant, because there has been no major structural surprise, and that bodes well for the future of the airframe.

T–1, the test airplane, is in service at Edwards today, and will continue in that role as far as I can see. The 24 aircraft in use includes one that was just recently brought on-line at Altus for training. So we are now occupying both Charleston Air Force Base as well as Altus Air Force Base in Oklahoma.

P–25, the 25th in the production series, will be delivered in a few days. It has flight soloed and it is sitting on the ramp today, going through final inspections and writing off the paperwork.

Bosnia was a real success story for the C–17. In spite of what has happened over the prior years, when the rubber really meets the operational ramp and goes through an operational test, as it did in that theater, that is when we are most proud and most satisfied. We hope you are, too.

The airplane delivered more than half the freight with one-fourth the sorties and, in specific, took over 91 percent of the total loads into Tuzla. It in fact did the very job that it was designed to do, getting into tight quarters and doing it repeatedly. It achieved 96 to 98 percent departure reliability, depending on what interval you count. That is very comparable to the best that you get in commercial service today. We will do our best to keep the airplane performing as it has been.

As Dr. Kaminski stated, our deliveries have been consistently ahead of schedule for the last couple of years—the last 12 aircraft—and we are getting a little bit better at that every day, trying to build our schedule margin and return in fact some of those delays that we encountered in prior years.

We will have a full and complete baseline on the production line at P–33, and most of the operational aircraft will be brought up close to that baseline in the next year. But by mid–1998, the entire fleet will be up a full-spec-compliant baseline across the waterfront. That will be good news for the operator.

Our quality is continually getting better, and I am personally determined to keep that story going. Today, in most industrial statistics, we are better than the industry average in just about every category. In essence, the design is stable and the fleet is performing better than I ever expected at this point in time.

We are making changes for affordability, but they affect how we build the aircraft. They do not affect the fundamental design characteristics of the machine. They do not impact the performance, as well.

We are also stable when it comes to cost. We are at or below target costs on both Lot 6, that is, P–21 through 26—we are coming up on the tail end of that lot—and Lot 7, P–27 through 32. In fact, we are proposing to go to a fixed-price contract on Lot 7. That would make Lot 7 and all future lots firm fixed price. I think there is a good news story there. We are essentially underway at company risk, protecting long-lead orders on Lot 9, the very start of the multiyear interval.

We have already covered how some of the omnibus funds and Government funds have contributed to the overall cost reductions, so I will not elaborate there. But it would help, I think, at this point, to somewhat describe what happened on the Lot 8 contract and how it ties in to the multiyear, particularly relative to Mr. Rodrigues' testimony.

We started out with a VIQ matrix that allowed us to offer aircraft from 8 to 12 in any given year. When you are running a production line, you do not like the numbers going up and down, so we stipulated you can ramp up at a variety of different rates, but no more than 2 in any one year, because that is a trauma. It is a big transient, and it is hard to accommodate.

So we had a limitation on the increase of no more than 2 units in a year. It was not that we were not willing to sell more or provide more, it is just that it is hard to provide firm fixed pricing if you are moving a production line from roughly 8—let us say you added 4—that is a 50 percent increase in production rate. Even General Motors would have a hard time doing that.

So, for stable pricing, we limited it to no more than 2 in any 1 given year. Then, once you were there, you could not go down. Now, why was that?

If we went to all of our suppliers, including ourselves, and said price out all the options up 1, down 2, up 1, up 2, you end up with an infinite number of options. Again, you get transience on the line. We wanted stability, not dynamics. So we just said let us not take it down. It is not that we would not go along with taking the line down, it is just difficult to provide firm fixed prices when the line is varying dynamically like that.

So we were looking for a nice, stable transient and get to a stable production rate. That all made good business sense to all of us.

Then, as history sort of unfolded in the last 6 months, a lot has happened, we offered at least one additional option called the acquisition decision memorandum profile. That formed ultimately the basis for what is in the multiyear. Now, that allowed us to go from 8, 9, 13, 15 as a profile, getting up to that rate of 15, but it really does not have much to do with the original VIQ matrix. Yes, we did say that up until you hit the point of 12, you can revert back to the original VIQ matrix, the variation in quantity matrix, simply because that is the pricing that we have.

If the Government wanted to go to 14 or 13 or 15, we just did not have the pricing to come back down to 12. So there is a little bit of a disconnect between Mr. Rodrigues' statement. We are willing to do anything that the Government wants us to do. It is just that there were two independent pricing options, the VIQ matrix and then the ADM profile was a stand-alone option added to that.

After about a year and a half of working with a joint cost model and multiple options, we are essentially at your disposal. We will do whatever DOD asks us to do.

I am also very much interested in the format of the contracts, the outyear stability, and you have to remember that there are a couple of basic fundamentals at work here. Price reductions, in part, particularly when you are talking to EOQ, are very much dependent on production rate and production quantity. What this country has historically seen in the past when we talked about multiyear—yes, they were smaller intervals, but much, much larger quantities—in the hundreds per year, whereas all we are talking about is 80 for the total program. Where they may talk about 500–600 units over the life of a multiyear, we are only talking 80.

Our initial year is 8, and maybe it will be a little higher—who knows. So our choices today are deciding whether we are going to build 8 next year or 80, not 150 and 500 or 600. So the quantity is a big issue that limits how much you can save. That is one of the reasons that contributes to the 5 percent. The actual production rate, the absolute production rate, even though we are at 6 today, we are going to build to 8, and eventually, hopefully get to 15. I am very happy with that, Mr. Chairman, but I got to tell you that is not real high production rates. So, recognize the economic window that we are in.

Part of this bears—if you will allow me just a moment to digress and tell you a little interesting story—this is an economic window of opportunity, and why the 1 June, why the 5 percent. Somewhat like in politics, in this case, timing is everything.

My daughter, a couple of months ago, contracted for a new home. The contractor proceeded to build. They subsequently went to the bank, locked in an interest rate at 7-and-a-quarter percent. A few weeks ago, the contractor comes up and says, Hey, we are going to be about a month late in closing. The banker said, Oops, your option ran out. They had to go back. They missed the window, and the interest rate went up to 8-and-a-quarter percent. One point over the life of a mortgage is a lot of money. That is what we are working with here. Small differences mean a lot.

When we started on the multiyear, we could see our way, within the limited resources of $300 million of EOQ, to savings of approximately 3 percent. We did not have all the data, but we had some fairly good data that said I could see 3 percent. The other 2 percent, we just could not see, and today, we still do not see it. If I had more EOQ, possibly we could save more money. But at a percentage basis, we could not get the 5 percent. So we took it as a management challenge, and that is basically where we are. That is why we discuss it.

We have some major decisions to make in the next 60 to 90 days, assuming that the multiyear procurement will be authorized, to decide where the money will be spent, whether we will buy inventory, turn it into an affordability initiative or a combination of the two. We have many, many options, a limited amount of resources, and we have to decide on the right parts.

To minimize the penalty of buying the wrong things should the program be terminated short of 120, we will also try to make sure that whatever we buy in terms of inventory could be diverted into the spares inventory, thus saving the Government some additional funds.

I might point out that all of these savings, for the most part, come from our suppliers. About half of our suppliers will be under contract for Lot 9 by June. In point of fact, they should have been under contract by 1 March. Our normal receipt of long-lead authorization for Lot 9 would have been in the March time frame, but because of the current uncertainties with multiyear and the uncertainties with the quantities in Lot 9, we have chosen to go at risk, avoiding the confusion of contracting with the Air Force. So, in essence, we are covering that risk up through the 1 June date.

Again, let me just point out that quantity and production rates are big factors. If they were a lot higher, comparable to other multiyear efforts, you possibly could see a bigger percentage savings. But, at this point, 5 percent is plenty aggressive from my standpoint, particularly after what we have accomplished in the last 18 months.

Let me close by simply stating that you also asked what options might the company offer in terms of additional multiyear proposals. We have been working with the Air Force in a variety of contingencies and what-if questions, some asked by members of Congress. We will provide whatever data our customer wants, and we stand ready, willing and hopefully able to continue keeping the C–17 in a good light, and retaining your confidence.

We appreciate all your interest and support for the C–17. Thank you very much, Mr. Chairman.

[The prepared statement of Mr. Kozlowski follows:]

PREPARED STATEMENT BY DON KOZLOWSKI

Mr. Chairman, Members of the subcommittee, we are pleased to have the opportunity to discuss the C–17 Program, and more specifically, to address the current Multi-Year Procurement proposal that McDonnell Douglas has made to the Air Force. But before discussing that proposal, I'd like to summarize some of the factors that demonstrate why Multi-Year Procurement makes good sense.

The contributions the C–17 has made in operations in the Bosnian theater as part of the peacekeeping mission are well known. All of us at McDonnell Douglas have been extremely proud of the Globemaster III's actions under some difficult conditions. The C–17 has flown just over a quarter of the intratheater missions from other bases in Europe into Bosnia, Croatia and Hungary, yet it has carried more than half of that cargo. In addition, the C–17 has proved itself in the intertheater, or strategic, role, flying cargo from the United States to Europe. The C–17 has demonstrated its capability in the direct delivery role that we designed it for as well, with an aircraft flying from Travis Air Force Base in California non-stop into Tuzla with a cargo of minefield marking devices. The C–17's ability to maneuver on the restricted runways and taxiways of the fighter base at Tuzla has proved to be a major asset, where unloading times have been running a half hour or less. It has carded troops, combat equipment, engineering equipment, bridges, humanitarian aid and a number of government officials and news media into the area. It has done it with reliability and maintainability rates near those of our Reliability, Maintainability and Availability Evaluation conducted last summer, even though this operation is 5,000 miles from home and being done with far less support personnel, in some of the worst winter weather in decades. The C–17 did this within a year of achieving Initial Operating Capability, with a commitment of over half the operational aircraft—a remarkable test for a weapons system so early in its service. The Air Force and Army personnel who are using the aircraft have high praise for the C–17. That's the kind of customer satisfaction we thrive on.

We recognize that our ultimate customer is the American people. In our latest proposal for multi-year procurement of the C–17 and the resulting savings of taxpayer dollars, we are trying very hard to provide a most responsible solution.

The initial proposal presented to the Defense Acquisition Board last fall showed our dedication to cutting costs. In that proposal, we cut $4.4 billion from the cost of the next 80 aircraft, based on our experience with the first 40 aircraft. Funding provided by the government for production line improvements, along with the McDonnell Douglas funds committed to productivity improvements under the Omnibus Settlement, contributed greatly to those cost-cutting efforts. The investment of $260 million by the government and $1 00 million by McDonnell Douglas resulted in a price reduction of about $1.2 billion. Our proposal at that time called for an average unit flyaway cost for the next 80 aircraft of $196 million (FY96$). The Department of Defense asked us to look at multi-year procurement and a more efficient production rate—and at a combination of the two. The more efficient production rate of up to 15 aircraft a year saves the government more than $13 million (FY96$) on each aircraft. The multi-year concept saves an additional $1 0 million on each aircraft, or nearly another billion dollars over the life of the program. With the increased production rate and the multi-year proposal, the next 80 aircraft have an average unit flyaway cost, including engines, of $173 million (FY96$). That's a big contrast from the average of more than $320 million on the first 40 aircraft.

Delivery performance has been outstanding over the last 12 aircraft—all delivered ahead of schedule. Productivity has increased by more than 500 per cent since the first aircraft—our workers are doing in just 1 0 hours the same task that was taking 50 hours a few years ago. Subcontractor productivity has been increasing as well. The design is mature. The changes we are planning for on the production line now are those that will make it easier to assemble and cut the cost, while continuing to add capability. In other words, this is a mature, stable program that is perfectly suited for the multi-year procurement concept.

We and the Air Force have worked to make this a unique multi-year with flexibility, getting away from big penalties if the multi-year contract is broken for reasons that can't be foreseen. As an example of flexibility: if, four years from now, Congress determined that national priorities would only allow the funding of 13 aircraft instead of the 15 as planned, the Air Force could maintain the multi-year contract by "selling" those other two delivery positions to a foreign government or other commercial buyers. This is a real possibility—foreign governments are suffering from the same airlift shortfall, especially out-size airlift, that this nation has been facing. They have seen the aircraft performing in Bosnia and have been very impressed with it. We have little doubt that there is a market for the C–17 with our allies—especially if we can assure them of a stable, affordable price under a multi-year contract.

Assuming the C–17 program continues, there are no additional penalties for changes to yearly buy quantities beyond those in the current annual option contract, although we must point out that reducing planned aircraft buys will clearly impact price.

The Congress has been a partner in reducing cumbersome regulations that don't serve to add value. It is this kind of thinking that we applied to the 7-year multi-year proposal. The current 5-year limit would essentially reduce the savings of the multi-year program by 25 to 50 per cent. The 7-year program allows us to take maximum advantage of the Economic Order Quantity funding for the next 80 aircraft.

There have been some questions raised as to why we need approval by June 1. We have based our prices on being able to have a contract by that date so that we can commit the EOQ funds as early as possible in making long-lead commitments for fiscal year 1997 aircraft. McDonnell Douglas also needs some assurances that the multi-year program will go ahead before we make additional investments in cost-cutting tooling and equipment to be ready for the higher production profile. After June 1 we simply do not have the full opportunity to reduce costs with subcontractors and suppliers of instruments and high-cost equipment that we now have, particulary in the first year. Some planned cost reduction efforts take place over a 3-year period. A delay would push that three-year period out a year, and affect the fiscal year 2000 acquisition of 15 aircraft, which under the current plan would have full advantage of the cost reduction efforts. This delay would erase 30 per cent of the cost reduction project savings planned under the multi-year. The commitments and arrangements we are able to take advantage of poor to 1 June are perishable, and that is just a fact of business life.

McDonnell Douglas is working with the Air Force and the Department of Defense to assure the best possible aircraft at the lowest possible cost. In our facilities, and at those of our subcontractors, we are adopting, with the cooperation and encouragement of the government, commercial-like practices that help us to lower the cost of the C–17, both the acquisition cost and the operating cost. We have tried to not limit ourselves to traditional thinking in this effort, because we know that affordability and savings is the key to success on this program. The current multi-year proposal is our response to a request from the Department of Defense for a specific plan. There are a number of different ways that C–17 procurement can go forward, and we have been providing information on a number of possibilities to the Air Force and the Congress. All have different aspects and terms and timing and savings that need to be considered in achieving a contract mutually acceptable to the Congress, the Air Force, the Department of Defense and McDonnell Douglas. We, of course, will continue to work with you on the schedule that makes the most sense. Multi-year procurement at a more efficient production rate of up to 15 aircraft a year provides the best bargain to the American people while preserving the flexibility to deal with all the needs of the Nation.

Thank you.

Senator COHEN. Thank you very much, Mr. Kozlowski.

Mr. Rodrigues, let me move to you first. How much less is the program costing as a result of the accelerated buy and the multiyear procurement as compared to the total estimate prior to this agreement?

Mr. RODRIGUES. I am sorry, someone coughed when you started your question.

Senator COHEN. I want to know what is the difference in total dollars committed to this program as a result of the accelerated buy, the multiyear procurement as compared to the original settlement agreement in total dollars?

Mr. RODRIGUES. In total dollars, let me try to do it a different way. If we go back to—you are comparing it back just without a multiyear procurement?

Senator COHEN. Prior to the settlement.

Mr. RODRIGUES. Prior to the settlement?

Senator COHEN. Correct.

Mr. RODRIGUES. There have been a lot of other changes, as Mr. Kozlowski said. The results of the settlement have had a significant impact on reducing costs. But, in total, if we look at total program cost, the total program cost prior to the settlement were estimated at $43.078 billion, and total program costs now are estimated at $43.074. So it is really about a $5-million difference when you round.

Senator COHEN. Five million, not billion, correct?

Mr. RODRIGUES. Five million, yes, total program cost.

Senator COHEN. OK.

Mr. RODRIGUES. There is one thing I would like to go to. Mr. Kozlowski said that we were in some variance, in terms of the contract, he is willing just to drop back the VIQ issue. I do not think there was any variance there. Where we were, my statement was that if you dropped back into the Lot 8 contract, the bridge-back provision, that in order to do that, you had to do it by a certain date to protect yourself, to protect the bid prices that are already on Lot 8. It is not that the contractor will not drop to any quantity you would like them to. I mean I am sure he would go to any quantity.

Senator COHEN. There is some confusion about that. Because on page 4 of Mr. Kozlowski's statement—I am just going to read it: The analysis shows that even if we were to break the multiyear buy and stretch out the procurement of 120 aircraft, this multiyear approach still saves money as long as we do not reduce the planned rate until after fiscal year 1998. If we buy fewer than 120, this multiyear approach saves money so long as we do not cancel the orders until after the year 2000.

He is talking about rate of production at that point. The buyback, as far as being able to not exceed the number of 13 pertains to buying back so you do not have to renegotiate the contract.

Mr. RODRIGUES. It is to preserve the right to continue on with the negotiated prices that exist under the Lot 8 contract.

Senator COHEN. That is right.

Mr. RODRIGUES. Without having to reopen negotiations. I do not think that we are saying anything differently.

Senator COHEN. No; we are saying two separate standards here. One is rate of production. The other is in terms of where the taxpayer is protected in terms of the amount. If we exceed 13, at that point, we no longer are able to buy back into the annual price.

Mr. RODRIGUES. Without renegotiating.

Senator COHEN. Without renegotiating.

Mr. RODRIGUES. Without renegotiating. It is actually exceeding 12.

Mr. KOZLOWSKI. May I, Mr. Chairman?

It is principally because we just never got around to pricing that option. That is all.

I might point out in the multiyear, though, we have added a dimension of flexibility to help a variety of people, including ourselves. That is, at any one year, we would be willing to allow the Air Force to sell the delivery positions that they would contract for, given that we could find a foreign customer, a foreign government, and/or a commercial customer, either one.

That way, the Air Force would get the same price under the current contract. If there was a budget dilemma, it would provide some relief to the DOD treasury. If we had a selfish interest in selling it, it would help us as well. So it is a win-win for everybody. That adds sort of a unique twist to this multiyear.

Senator COHEN. But we should be very clear, we are going to have to write this into the contract very specifically.

Mr. KOZLOWSKI. It will be in the contract, yes, sir.

Senator COHEN. So that when we go to the floor with our recommendation we can count on that very specifically. It may change. As a matter of fact, I was going to get into this in a moment, after we have completed a round, but we may want to in fact accelerate some of that production.

I look at your numbers, Dr. Kaminski. The final year of this buy, the 7th year, the price goes up, from 154 to I think 174 or something like that.

Dr. KAMINSKI. Yes, Senator Cohen. The reason that price goes up, however, is that there is a program tail cost of about $170 million.

Senator COHEN. Have you looked at the CBO analysis, which indicates that we might be able to in fact move those 5 aircraft up to the first 3 years and achieve additional savings?

Dr. KAMINSKI. You can move those aircraft up, but you still have that tail cost of the program. So, what I am saying is this rampup that occurs really is sort of an artificiality of that fixed cost that remains at the end of the program.

Mr. KOZLOWSKI. That is correct.

Dr. **Kaminski**. You will not save that by—the program structure may be better by moving them in some way, but the tail end costs will not change.

Mr. **Kozlowski**. In today's day of full and honest disclosure, that tail-up is in there just so no one is surprised. But it is really for closing out the program. If, for one reason or another, production continued on, that burden would be passed on to whoever closed the program.

Senator **Cohen**. Would you agree that it would make perhaps more sense for program stability to move 5 aircraft up to the first 3 years? In other words, the profile right now is, starting in fiscal year 1997, 8, 9, 13, 15, 15, and 15. If you were to move it up so that 1997 is 9, 11, and then to 15 in 1999—that gets us up to 15 quicker than what you have it here, Mr. Rodrigues, does that in effect have an impact on that renegotiation buy-back?

Mr. **Rodrigues**. I think the prices in the VIQ that are quoted—and those are the ones that we have a lock on now that we can drop back to under the Lot 8 contract. I do not know that they would match with this kind of a rate change. Mr. Kozlowski could answer that better than I could. But you do have to worry about whether where this puts you at any given point in time offers you a drop-back position into the VIQ contract.

Off the top of my head, I do not know the answer to that. If it does, then it becomes a matter of how fast they can increase rate, which he certainly would be better to address.

Mr. **Kozlowski**. First of all, we have a common cost model that we share with the Government. Within the limits of the VIQ matrix, it is probably the most thorough cost model I have ever come across. So, certainly, in the first 2 years, the 9–11 profile, that can be traceable right back into that pricing databank. When you jump from 11 to 15, as you suggested, again, you have a significant trauma on the line.

At best, what I would do if I were confronted with that, I would tend to smooth the deliveries so that you do not have to go out in any one given year and have a big spike in employment and all that that entails. But it is certainly within the factory capacity limits. That is not an issue in any of this discussion.

More appropriately, there are other priorities, as you well know. I guess I would turn it over to Dr. Kaminski to talk about budget dilemmas.

Dr. **Kaminski**. Mr. Chairman, I think there are really two issues associated with moving those aircraft forward. I believe the program is executable either way—either in the way we proposed or with that move forward. The two issues are from the standpoint of program stability. There will be an issue in fiscal year 1998, as well, that is committing to providing those additional aircraft on the ramp in fiscal year 1998. They are not in our current program. So provisions have to be made not only in fiscal year 1997, but in fiscal year 1998 to include that base.

The second issue is that we need to know very soon about the size of the lot in fiscal year 1997. We are really already a lead time away to be making that decision. So if we are going to adjust the 1997 program, the 1997 lot, and put it into this buy, we have to move very quickly to do that.

Senator COHEN. Well, as I was just referring, the Secretary of the Air Force has written to the committee indicating that very soon you are going to fall below the mandated mobility of 48.8 million ton miles. Accelerating the C–17 purchase might fill that shortfall.

Senator Lieberman.

Senator LIEBERMAN. Thank you, Mr. Chairman.

First off, thanks to all of you gentlemen for being here. We have all enjoyed the C–17 story, because it has gone from near failure to great success. So it is a happy story, and we hope you can keep it going.

Mr. Rodrigues, let me ask about some of the suggestions or statements you make in your report. In the first place, you are questioning whether we need to acquire an additional 120 C–17's, am I right?

Mr. RODRIGUES. I have work ongoing now that we will be reporting out probably in the next 2 or 3 months addressing that issue about what do we need to actually meet the requirements. It is based off the same analyses that Dr. Kaminski referred to, the SAFMA studies and the mobility lift requirement studies. We will have the details out on all of that, based on the work that we have done to date. We have looked at the options.

When Dr. Kaminski was presented with the options within the Defense Acquisition Board process, they were looking at specific splits of C–17 and non-developmental aircraft. If you looked and just focused on what was presented in there, clearly the decision that was made was the correct decision. Our best option under what was presented was 120. Based on looking at the details of the analyses that supported the basis for those splits, there is some very good questions about whether we could not have just done an all-C–17 fleet at a lower rate, at a lower number, which was not part of the consideration. They were looking at specific options of mixes. We looked at the whole study.

As I said, we will be completing that and reporting that out in the next 2 or 3 months.

Senator LIEBERMAN. How about the later reference in your report that an option of 100 C–17's could meet the current strategic mobility requirement?

Mr. RODRIGUES. That is what we will be talking to in that report.

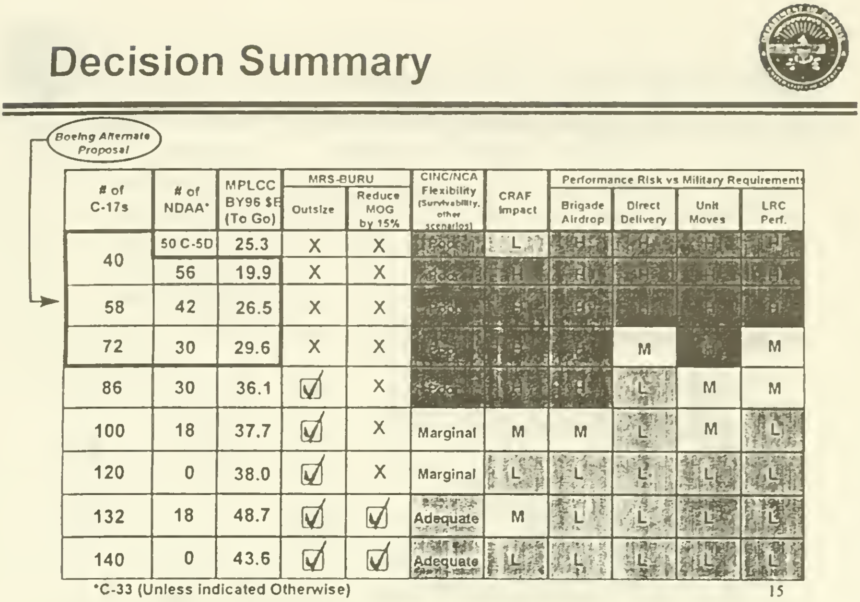
Senator LIEBERMAN. So that is not a conclusion at this point, the 100?

Mr. RODRIGUES. Right. We are working on that. But that is what the data is pointing to at this point in time. We just wanted to make you aware of that.

Senator LIEBERMAN. Secretary Kaminski, would you respond to that and defend the Pentagon's conclusion that we need 120 more of the C–17's?

Dr. KAMINSKI. Certainly Senator Lieberman. If I may, what I would like to do is show you the chart that was presented to me at the DAB, as we looked at making this decision.

Senator LIEBERMAN. Good. [Chart.]



Decision Summary

Boeing Alternate Proposal

# of C-17s	# of NDAA*	MPLCC BY96 $B (To Go)	MRS-BURU		CINC/NCA Flexibility (Survivability, other scenarios)	CRAF Impact	Performance Risk vs Military Requirement			
			Outsize	Reduce MOG by 15%			Brigade Airdrop	Direct Delivery	Unit Moves	LRC Perf.
40	50 C-5D	25.3	X	X	Poor	L	H	H	H	H
	56	19.9	X	X	Poor	H	H	H	H	H
58	42	26.5	X	X	Poor	H	H	[illegible]	[illegible]	H
72	30	29.6	X	X	[illegible]	H	[illegible]	M	[illegible]	M
86	30	36.1	☑	X	Poor	H	H	L	M	M
100	18	37.7	☑	X	Marginal	M	M	L	M	L
120	0	38.0	☑	X	Marginal	L	L	L	L	L
132	18	48.7	☑	☑	Adequate	M	L	L	L	L
140	0	43.6	☑	☑	Adequate	L	L	L	L	L

*C-33 (Unless indicated Otherwise)

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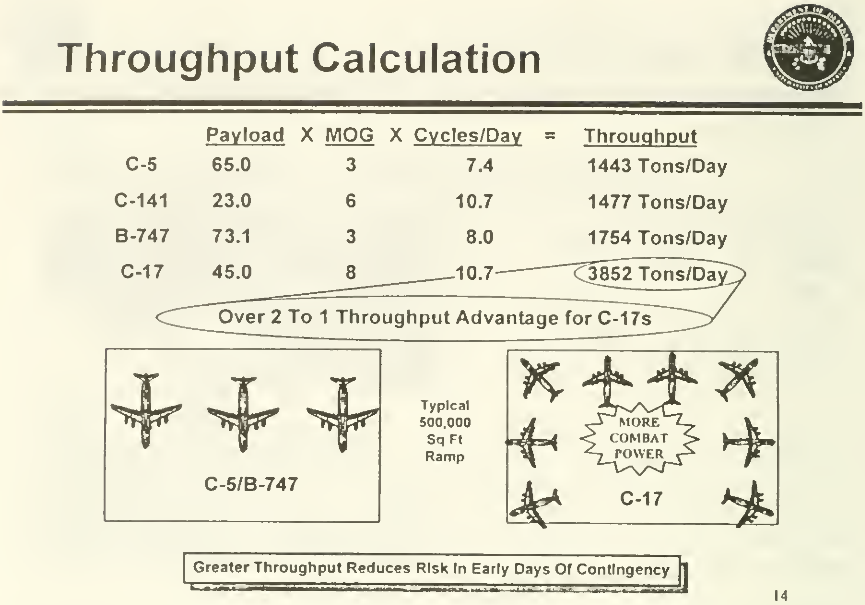
Dr. KAMINSKI. As we did this whole analysis, we compared a number of options. What I am showing, first of all, in the options—and the options are going by row here—when we started this program, we had 40 committed to. Then we looked at additional combinations, some involving C–5's.

Let me jump immediately down to this area, because it is a little easier to explain. This shows options that involve a combination of C–17's and non-developmental aircraft. This was a modified Boeing 747. We were looking at mixes of these.

This third number is the life cycle cost associated with these options—the acquisition and the operating costs. That is in billions of dollars.

Moving over now to the next column, the MRS–BURU. That was the mobility requirement study, Bottom-Up Review requirements. Did we looked at did we meet the carrying capacity required for out-sized cargo? The check indicates that we met it.

I also did some work to look at this parameter called MOG. This arcane parameter means maximum aircraft on the ground. It has to do with how effectively you can load and operate aircraft on the ground. If I might illustrate that just very quickly. [Chart.]



Throughput Calculation

	Payload	X MOG	X Cycles/Day	= Throughput
C-5	65.0	3	7.4	1443 Tons/Day
C-141	23.0	6	10.7	1477 Tons/Day
B-747	73.1	3	8.0	1754 Tons/Day
C-17	45.0	8	10.7	3852 Tons/Day

Over 2 To 1 Throughput Advantage for C-17s

C-5/B-747

Typical 500,000 Sq Ft Ramp

MORE COMBAT POWER

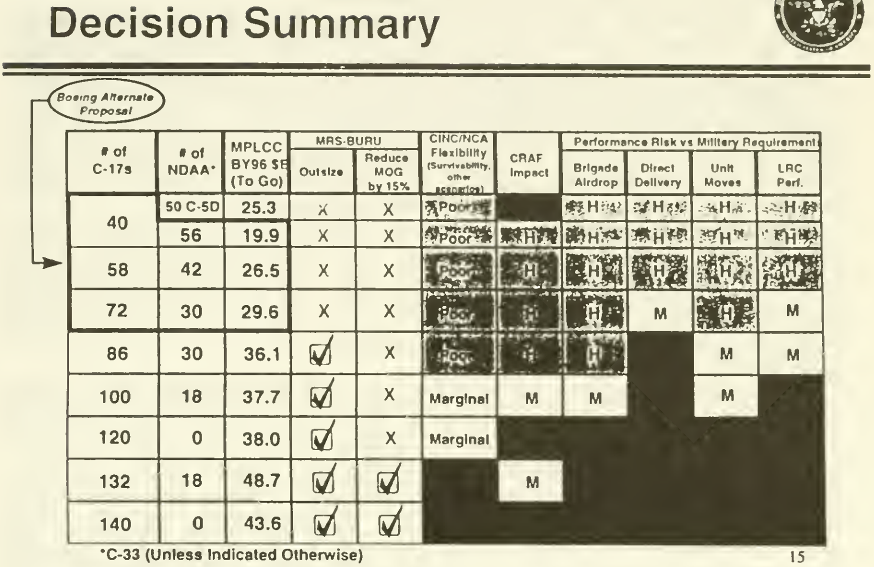
C-17

Greater Throughput Reduces Risk In Early Days Of Contingency

Dr. KAMINSKI. The C–17 had some important features that other aircraft, other wide-bodies, do not have when you have limited space on the ramp. This shows an actual loading in analysis where, with a given space we might be able to fit three C–5's or 747's, we would have the ability to fit eight C–17's. This is an illustration of this maximum on-the-ground parameter.

What we have found, looking at the results of using the C–17 in Bosnia is that these numbers prove out to be just right, in fact, of what happens when you are constrained by unloading and offloading space, as to what you can really put through the aircraft.

If we can go back to the original chart. [Chart.]



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			Outsize	Reduce MOG by 15%			Brigade Airdrop	Direct Delivery	Unit Moves	LRC Perf.
40	50 C-5D	25.3	X	X	Poor		H	H	H	H
	56	19.9	X	X	Poor	H	H	H	H	H
58	42	26.5	X	X	Poor	H	H	H	H	H
72	30	29.6	X	X	Poor	H	H	M	H	M
86	30	36.1	☑	X	Poor	H	H		M	M
100	18	37.7	☑	X	Marginal	M	M		M	
120	0	38.0	☑	X	Marginal					
132	18	48.7	☑	☑		M				
140	0	43.6	☑	☑						

*C-33 (Unless Indicated Otherwise)

Dr. KAMINSKI. What usually happens with this MOG parameter is that there are many situations in which it is easy for the MOG to be reduced by 15 or 20 percent. So I wanted to do a little sensitivity analysis in constrained operating areas to reduce the MOG by 15 percent. You can see that causes the check marks to go way down.

Then I also had a number of other parameters looked at. Inputs from the CINC's and the National command authorities using the aircraft, how they felt about the flexibility of the fleet—subject assessment. You see that those assessments were red all the way to the point to where we got to 100 C–17's combined with 18 NDAA's. Then they started to go into yellow—marginal.

The impact on Civil Reserve Air Fleet (CRAF). The impact on being able to drop a brigade. The direct delivery requirements. So, when we were all done and I looked across the chart, the place where I began to look at realistic mixes was at the combination of 100 and 18. What Mr. Rodrigues was pointing out is he looked at another option which did not have these 18, but simply looked at the 100 C–17's by themselves.

As I looked at these two options, I concluded that we could marginally meet the requirements with this mix of 100 C–17's and 18 NDAA's. We would have fallen shorter of this had we been with the option suggested that did not have the 18 NDAA's. We would have done worse. I cannot tell you to what degree.

But as I looked at these two options, I saw that for less than 1 percent additional cost, we could move to the pure C–17 fleet and turn all these yellows into green, and come very close to meeting the requirement with 15 percent reduced MOG. My opinion at the time of this 1 percent additional cost was that it was worth the price to buy this added flexibility.

Senator LIEBERMAN. So, Mr. Rodrigues, I do not understand, then, where you depart from that analysis.

Mr. RODRIGUES. We will be addressing each of the items across the top in terms of the unique characteristics that the C–17 brings, unique military requirement kinds of issues, as well as the flexibility issue. What we are looking at, as Dr. Kaminski said about when they were looking at it, they were looking at it in terms of the way the whole process was laid out, which was a mix of aircraft. As I said, if you are looking straight at that mix, your answer is going to be, for 1 percent, a total C–17 fleet is the right answer.

What we are doing is looking at it and saying, the driving factor, the thing that the C–17 can do that you cannot get done any other way are certain unique military requirements, and we are looking at that saying where can you meet that, where do you meet that requirement? Then looking at the others and saying, what are the trades available?

In the analysis that we will do, we will go through each one of those things and show you what happens if you have 100, and what kind of tradeoff. So the difference is the 100 versus 120. We will talk about the marginal difference in total time of delivery. I think I cannot start talking about it in detail. It is classified. Also, about the option of some marginal prepositioning to offset any slight variance in timing. What we will do is lay that all out, and it is another option that is available with substantial dollar savings involved.

We will be completing that in the next couple of months.

Senator LIEBERMAN. All right, we will look forward to that. For now, I remain convinced by Secretary Kaminski's argument.

Thank you, Mr. Chairman.

Senator COHEN. Senator Warner.

Senator WARNER. Mr. Chairman, my first comment would be that I would like to associate myself with the remarks of the distinguished chairman in his opening statement.

Dr. Kaminski, you seem to come up here on a lot of hot problems, do you not?

Dr. KAMINSKI. Yes, sir. It comes with the territory.

Senator WARNER. Did they put that in the job description? [Laughter.]

The missile defense hearing is one you will not forget, will you?

Dr. KAMINSKI. No, sir. [Laughter.]

Senator WARNER. My concern is that as the Department of Defense and the several military departments look at the outyear budgeting, what is the impact of this program as proposed today on other programs of a high priority within DOD? To what extent was that considered at the time this rather unusual procedure was adopted?

Dr. KAMINSKI. Mr. Chairman, my assessment is that from almost all points of comparison, making this multiyear move is positive on all of the programs in the Department, in that, one, it is done within the existing funding profile that had been allocated for the program.

Senator WARNER. Were you a party to the budgeting aspect of this?

Dr. KAMINSKI. The budget decision, sir?

Senator WARNER. Yes.

Dr. KAMINSKI. Yes, I was.

Senator WARNER. You were?

Dr. KAMINSKI. Yes, sir.

Senator WARNER. So you can speak from firsthand knowledge?

Dr. KAMINSKI. I can speak from firsthand knowledge as a member of the Defense Resources Board. Certainly, I was not the decider in the board, but I was a participant.

Senator WARNER. So you looked at the possible addition of more B–2's, the Naval shipbuilding program, various Army programs, whether it is tanks? All of the major programs were put side by side, is that correct? The F–22 the chairman brings to mind.

Dr. KAMINSKI. Yes, sir. Let me say that as we did our budget, we put this C–17 program in its priority with all of the programs, having done that as the Defense Resources Board in the Department. When we looked at the multiyear, we were able to execute this multiyear program within that resource profile. In fact, what it did was free up resources for other programs.

Senator WARNER. Because of a projected savings?

Dr. KAMINSKI. Yes, sir, because of the between $800 million and $900 million of savings. That freed up resources. It will free up resources in the outyears for other programs. So I assessed the impact to be positive, Senator Warner.

Senator WARNER. Well, if you look at the Department of the Air Force, with the F–22, the C–17—and there are kind of rumors around maybe about some more B–2's—I am wondering what the rest of the military departments have got left.

Dr. KAMINSKI. I am not sure I understand.

Senator WARNER. Well, if you look up at the big dollar value associated with the F–22, the big dollar value associated with the C–17, and just put a question mark about the B–2, because that tends to be another political item that is out there, if you look at the total Department of the Air Force programs, you have got quite a big hunk of dough going to the Department of the Air Force. Am I not correct?

Dr. KAMINSKI. Yes, sir, we do.

Senator WARNER. What impact is left, then, on the Department of the Navy and the Department of the Army? I mean it has been usually, for years, not necessarily an even allocation—they each have bump-ups and drop-offs, depending on the particular program and the fiscal year. In other words, we do not divide our procurement bucks one-third, one-third to the three departments. But this is an unusual wedge that you are putting in the outyear budget for the C–17, alongside a most unusual wedge of the F–22, and a possible wedge of a B–2. I am beginning to think there is very little divided up between the other two military departments.

Dr. KAMINSKI. Senator Warner, we have no wedge in our budget for the B–2.

Senator WARNER. I understand that. But someone might come along and put one in who has got more authority than both you and I times two.

Dr. KAMINSKI. Senator, I am not recommending that.

Senator WARNER. No, I understand that. I understand that. I understand that very clearly. But I am just looking at what I perceive could be an extraordinary imbalance in procurement dollars going to the Department of the Air Force and procurement dollars going to the other two military departments. I guess the most you can say is shake your head, because this decision, I suppose, was somewhat above your pay grade, too.

Dr. KAMINSKI. Senator, I can say that this is among the Department's very highest priorities to provide this lift, not just for the Air Force, but for all our forces. It is right at the top of the CINC's priority list.

Senator WARNER. No question about it. I have been an active member of this committee and I have supported this program for some time.

I think the chairman has covered many of the points that I wished to make about how it was handled.

When does the Air Force plan to sign the proposed multiyear contract for the 80 C–17's?

Dr. KAMINSKI. Sir, I do not believe we have a firm date in place to sign that contract. We certainly need approval for the program before we are in a position to do that.

Senator WARNER. Yes, while Congress is so active now.

What are the implications for the C–17 program if legislation approving the multiyear program is approved in September or October through the regulation authorization process instead of the June date set by the administration?

Dr. KAMINSKI. Senator Warner, the impact of that is that we will be able to impact less than 80 aircraft in this program. What we have set up is a program to actually have firm negotiations for all the suppliers. That is on the McDonnell Douglas' side of the interface. But they have now been in discussions and in negotiations with all their suppliers. Sixty percent of this aircraft is subcontracted out to the various suppliers. The June 1st date was arrived at because that is the date that many of those suppliers need to be turned on to be able to meet their commitment to impact the fiscal year 1997 piece of the buy.

So to the extent we do not miss that date, what we will end up doing is slipping the number of aircraft that will be impacted on this multiyear buy. We will miss one lot and perhaps even part of a second lot.

Senator WARNER [presiding]. Senator Lieberman, before you go, have you had plenty of opportunity for questions?

Senator LIEBERMAN. Sir, I regret that I must depart from this hearing. I associate myself with your questions and concern about where all the money is going to come from.

Senator WARNER. Would you kindly express that a little more forcefully? [Laughter.]

Senator Robb.

Senator ROBB. Mr. Chairman, I thank you.

One the areas that I wanted to explore is the one that you were just exploring with respect to the consequences. All three of the witnesses, in various ways, alluded to concerns. But I wonder if I could direct this question to Mr. Kozlowski.

With regard to the ramp-up in numbers beyond, what, 8—we have got, let us see, 6, 8 in 1996, 8 in 1997, and even in 1998 we are still only at 9 under the current schedule—in order to get up to 15, are you going to have to make significant additional capital expenditures, particularly of the kind that would not be recoverable? Would those be reflected in the tail-up costs that was discussed in terms of taking those down if they did not have some comparable use for any other product line or any other aviation line that you might have involved?

Mr. KOZLOWSKI. Let me rephrase your question a little bit: Is there any significant capital investment? Every dollar is important to me. But the total amount of capital investment for the C–17 this year is around $20 million, and it goes into a variety of different areas, mostly in facilities investments, which are recoverable through other means.

So, no, there is nothing specific that I would consider at the level of discussion we are today. There is no capital investment threat out there, if you will. So that does not bother us at all.

Senator ROBB. With respect to the possible slippage—and I understand both your analogy to your daughter missing the window on a mortgage interest rate and the other dates for the subcontractors and suppliers—but is there not some degree of arbitrariness involved in both your date and their date? Or, to put it differently, if for whatever reason Congress decided it could not or chose not to enter into the multiyear procurement contract at this point but did so next year after that slippage and after some of the planes that would be in the lots that were just described, or at least a year may have fallen out, but what other factors that are influencing the total cost would change the dynamics of that equation if we came back to it next year? I am not advocating that, but I am trying to get some objective idea as to what we lose by not rushing to judgment.

Mr. KOZLOWSKI. Bear in mind, again, the planning that was used going into the offer that we put on the table, Lot 9 was going to be 8 airplanes. We are only going to build another 80 in this whole multiyear deal. Therefore, if you do not catch the window by 1 June or within days of that date, we will miss the majority of our suppliers and they will go on and build 8 rather than 80. You will miss the opportunity to get the savings, so you miss 10 percent of the quantity. If the quantity is increased in 1997 and we are still in that dilemma, you make it even more time sensitive from an investment standpoint.

We will be releasing shop orders to cut—we have already issued orders to protect material delivery—just raw material. A lot of the suppliers will be issuing shop work orders to go cut that material within the next—in some cases—within the next few weeks. That is how time sensitive this is.

On the other side of the coin, what happens if you wait? Let us suppose we just miss that. Well, you are going to miss at least 10 percent of your opportunity, maybe a little bit more. But there is another intangible, and it is a very important one when you are negotiating with the suppliers. Right now, we have the best opportunity of what I will call leverage over the supplier network. Most of the savings are going to come from the suppliers. Some come from small mom and pop shops. That is where you get the best return on your investment.

A year from now, the next cycle, there is no guarantee that that cycle, in spite of the optimism on the Hill, that it will be clearly defined in the next couple of months, much less prior to November, much less after November, et cetera, et cetera. Things change. Timing changes.

Another major factor which I have described behind the scenes is any more slippage in this package and we will probably have to start all over in terms of going out for quotes, reestablishing the database. The currency of the pricing estimates all needs to be brought up to speed. It takes us a fair amount of money and probably about 6 months to put a package like this together. If it falls apart, we start over. We would probably be the pacing item then if we miss this window, just in response time.

Senator ROBB. Obviously, the availability of resources, both current and projected—and relating to the question that my colleague from Virginia raised just a minute ago—in terms of perception of the allocation of whatever finite resources we have within the various services and to meet their needs do not always lend themselves to the same efficiency that we are trying to achieve in all cases. But I understand your answer and I thank you. This has been very useful.

Mr. Chairman, may I say that I am delighted not being a member of AirLand, but being a member of Seapower. I was not certain that I would have an opportunity to participate in this particular hearing. But I thank you for that opportunity.

Senator COHEN [presiding]. Well, I just want to put the Senator from Virginia on notice, he may have to take some money out of the follow-on to the *Seawolf* in order to accommodate the multiyear procurement for the C–17. [Laughter.]

I just wanted you to be part of it. [Laughter.]

Senator ROBB. I would share the pain. I think that the very recently departed Senator from Connecticut would want to be heard on that issue as well as NAS. But I will not extend that discussion.

Senator COHEN. Thank you.

A couple of more questions. Mr. Rodrigues, I am not entirely clear, based on the testimony you have given. It seems to me that a fairly large portion of that 896 savings that the Air Force now estimates would come from multiyear procurement either is not going to materialize or it could be achieved without the multiyear procurement. Could you address yourself to that?

Mr. RODRIGUES. Let me do that. I need to break that into different parts. We need to talk about the airframe savings and the engine savings separately.

Senator COHEN. Right.

Mr. RODRIGUES. In terms of the air frame, the Air Force estimate is $760 million. In looking at that and talking to the—of course, we do not have any details of how all that is, but we were told that $100 million of that would be for these productivity enhancements, the programs that we are funding that Dr. Kaminski talked about. It was $100 million actually in fiscal year 1996 money set aside for projects. Our understanding from the Air Force is that $100 million of the EOQ money could be used, and they think they are going to be using now, to fund those kinds of projects.

Well, those projects could have been funded under the PEPI contract that exists. They were planned to be done. They are to improve McDonnell Douglas' ability to build the aircraft. They are producability enhancements.

So you look at that and you say it was $100 million. The estimated rate of return on those dollars under the program is $4 return for every $1 invested. You are talking $100 million investment, $400 return, your net savings is $300 million. That would come out of that 760. So that would leave you with——

Senator COHEN. So you are down to what, approximately 460?

Mr. RODRIGUES. 460 on the airframe.

Then as I talked about the engine contract, the Air Force estimate is $122 million. Pratt & Whitney's offer on that is $88 million. I do not know where you make up the difference in that. Then the other $14 million from other sources, the Air Force could offer us nothing to substantiate that at all.

So when you net it all out, you are talking about a net of about I think it is $460 million that is really directly attributable to multiyear. The balance of the savings you would be able to attain through either investing in producability enhancements on the normal program and continuing on with an annual buy profile at the accelerated rate.

Senator COHEN. So, as far as you are concerned, rather than the $760 million plus $122 million they claim on the engine, that we are looking at about instead of 896, 460, according to your analysis?

Mr. RODRIGUES. On that order. I would also point out that under that kind of an arrangement, we are talking about the real effect on EOQ is $200 million, since $100 million of that right now looks like it is going to be producability projects that we would have done anyway. We would have funded those separately under either program.

Senator COHEN. Would you like to respond to that, Mr. Kozlowski?

Mr. KOZLOWSKI. Yes, I would.

Senator COHEN. I mean it is a real problem for us getting here. Because on the one hand, we are told that here is a multiyear procurement that is going to save some $896 million, and we have GAO saying it is about half that in actuality on just the multiyear procurement.

Mr. KOZLOWSKI. First of all, just to bring it up the currency, a couple of years back, when we started this affordability engine, you had a longer time interval—a bigger window of opportunity to implement cost-reduction projects. That time is winding down. That is another reason for the urgency of this.

The current affordability package that we had on the table that we were considering earlier this year, the gross return is about 3 to 1, not 4 to 1. The net basis is about 2 to 1. It is 2.06. That is just current data. It is not that we disagree. That is just the current data.

The original packages, on a net basis, prorated for the ADM profile, which is another correction you have to put in that data, all the prior affordability comes in at around 3 to 1. I would be glad to provide some background information to Mr. Rodrigues for that.

Now, given that, when you invest or put up $300 million of EOQ, what you are largely doing is putting a down payment on a product. If you go out and buy a car, what we are talking about is $300 million goes as a down payment to that car. It goes toward the purchase price of the car.

In that context, what you are really getting in terms of return is to put that money up early as a down payment, then you are getting a 5-percent discount. Yes, you could go back and you could spend the affordability money. But that is outside of—that $100 million that you are spending is not buying airplanes. That is why you have to deal in net returns and not gross returns.

In this case, the money that is essentially available from prior years goes directly into buying future airplanes, which is a good thing to do, and you get the 5-percent discount. So, in essence, I look at it, as a taxpayer, you are getting almost an infinite return just by deciding that it is EOQ. You can argue about the semantics on this issue, I guess, ad infinitum.

We went round and round. We have a big decision in front of us in the next 60 to 90 days—and we are proceeding as if this was going to happen, because the clock is winding down—we have to decide just what ratio of EOQ we are going to spend for inventory versus this affordability engine. If it turns out we get a higher return just by buying all inventory with a limited amount, the $300 million EOQ that is available, that is what we will do.

If, on the other hand, we can stick our neck out and take the risk on affordability initiatives, largely what that means is you are betting on the outcome that you will achieve the cost reduction—It largely occurs in the outyears, not the near-term years—we will have to eat the 5 percent discount in the early years.

Those are the kind of things that are just going on like crazy in my head, and will be for about the next 90 days. The condition that he cites about spending roughly $200 million for inventory and $100 for affordability is just a nominal case. That decision has not been made.

Dr. KAMINSKI. Senator Cohen, if I might comment. I, too, believe that the return figures of 4 to 1 for the investment improvements are probably high and that we have this matrix to work through. A second point I would make is that indeed there is a difference on our assessment of the engine multiyear savings. We are not through negotiating. We expect to reach a more aggressive target on the savings for the engine multiyear as the savings we estimated in the program. We do not have those in hand yet, but our projection is we will get there.

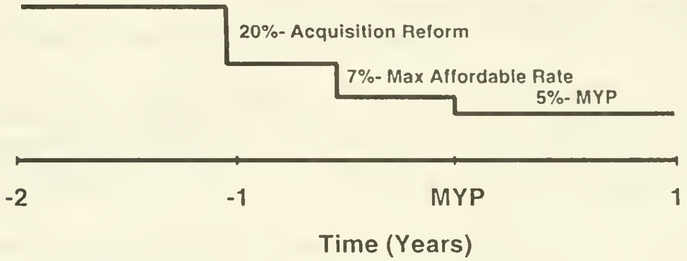
The third point is probably the most important. I wonder if I could get this chart back.

Senator COHEN. When do you expect to have them in hand?

Dr. KAMINSKI. Mr. Chairman, what we will do is give you our best indication. I think we will have a track record showing where we are. We may not have it signed until June, but we can give you the best update.

Senator COHEN. Well, our clock is ticking to May 24th. [Chart.]

C-17 Cost Reduction Track



Significant C-17 Cost Savings Prior to MYP

Dr. KAMINSKI. I would say we would stick by, I think, the savings we would achieve. We have not achieved it yet. But probably the most important point I would make in this whole argument is that we are talking about this 5 percent that goes with the multiyear. We have just pocketed the 7 percent that goes with the affordable rate.

I would say that one of the problems with multiyear is you tend to get fixed to a stable program. One of the benefits of a multiyear program is also that you end up with a stable program that you are likely to proceed on with discipline. I think what is likely to happen is that the 7 percent that we have taken for granted, we are likely to achieve that 7 percent if we have a multiyear program.

If we do not have a multiyear program, people in future years will be wanting to play with the year-to-year procurement rate. That 7 percent, Mr. Chairman, will be at jeopardy to some degree in the future. So I think this combination is the reason in my own mental accounting, being realistic about what happens here with budgets and programs in my experience, is that this multiyear is also an insurance policy to, in effect, achieve that 7 percent.

Senator COHEN. You mean you think there might be some competition coming from other weapons programs that need to be funded and they would say let us just cut back?

Dr. KAMINSKI. Yes, sir. There is always the risk of that adjustment.

Senator COHEN. In front of this committee? [Laughter.]

Mr. Kozlowski, do you want to repeat what you said in the beginning about what a pleasure it was to come today. [Laughter.]

A final question, Mr. Rodrigues. Could you tell us a little bit more why you think that contract provision allowing the Government to retreat to the Lot 8 contract is important?

Mr. RODRIGUES. Yes, sir. The reason is we are looking at an offer, in effect, without a lot of detail behind it. We are looking at a program where there is a lot of money in change order money, in producability enhancements.

Senator COHEN. We are still undergoing design changes on the C–17?

Mr. RODRIGUES. Design changes left over from IOT&E that still have to be incorporated. As Mr. Kozlowski indicated, we have delivered aircraft 24; we are about to deliver 25. The first aircraft that is fully spec compliant is aircraft 33, which is scheduled for delivery in I believe August of 1997. So there are a lot of things going on.

I look at it and say, it gives you the option, at that point in time, to reassess the contractor's ability to deliver under the contract, to make all these things happen. It is there. It is available. It protects you. It allows you to enter into this multiyear. If things are not working out, you can still reassess it at that point in time. It will let you take advantage of the offer that is being made here without understanding all of the underlying provisions, in terms of the actions that would be taken to have these savings.

But I think more importantly is I do not think we want to have anything that would put us in the position where our relationship with McDonnell Douglas could be back where it was before the settlement, either to the degree that you force an inordinate amount of risk on the contractor—and I am not sure that we are or we are not.

We all agreed, I think, when we were talking about the split in the $300 million, some of it is going to go to producability enhancements. We do not know what we get out of that. I have looked at some of those. Some get great returns. Some do not get such great returns. But there are a lot of unknowns in there: the pricing. Are they going to be able to get the discounts that they want from their vendors? Nobody has firm——

Senator COHEN. So-called management challenges.

Mr. RODRIGUES. There are a lot of things going on. There is a lot of flexibility. Do not put us in the kinds of positions that we got into in the past with this program.

So I look at it and say, is the number right? I think Mr. Kozlowski made a very good point earlier. When you look at prior programs and you look at the 7—it is actually 7 to 17 I think on a lot of those programs, the prior multiyear estimates of savings—they were much bigger programs. When you look at it against this program, this is a relatively small program in quantity.

So there was not variation in the production quantities from the annual buys to the multiyear buys in those. There were not big variations. But they were much bigger programs, so your opportunity for savings probably were greater.

Is 5 percent a right number? I do not know. McDonnell Douglas is willing to sign up to that on the air frame. I think there is risk in there. I think they think there is risk in there. They clearly came in with a lower offer originally and the Department went back and they came back with a higher offer.

There are a lot of unknowns. As long as that option is there, you have the opportunity to reassess that. It is what is good for the Government. What is good for the Government in this case may also have to be something that is good for McDonnell Douglas at that point, depending on how well we are able to proceed with the program. It is just an opportunity to move on with this and at the same time protect your rights.

In terms of what you are risking—see, I look at it and say you are really risking $200 million in EOQ if we are thinking about pumping $100 million in producability enhancements that we would probably do anyway and fund anyway. So if you are risking that $200 million, what is the risk? Mr. Kozlowski said they would be trying to identify the very stable parts. The ones that, for whatever reason you changed your mind about this program, could then go into supply inventory if they were not used on actual aircraft production.

I mean those are the kinds of things that would significantly reduce the risk of buying bad items or items that you may not need in the future. Then what you are talking about is really the cost of money. What does it cost you to front them $200 million now?

Senator COHEN. So, in other words, that provision is pretty critical in terms of protecting the taxpayers' interests, right, Mr. Rodrigues?

Mr. RODRIGUES. Yes, sir.

Senator COHEN. OK. You would agree, Dr. Kaminski?

Dr. KAMINSKI. Yes, we would be willing to support that provision, Mr. Chairman. I think I agree completely with Mr. Rodrigues that getting on the basis of an adversarial relationship, that is what caused the problems in this program to start with. It is not going to serve either the United States Government or the Department or McDonnell Douglas to get back on that kind of a basis.

Senator COHEN. Mr. Rodrigues, are you going to be in a position to give us further assessment as you get more information, including the benefit of this hearing?

Mr. RODRIGUES. Certainly, Senator.

Senator COHEN. It would be helpful if you keep us updated as we go through this process. We will be reporting to the full Senate in the next couple of months.

Dr. Kaminski, thank you very much.

Mr. Kozlowski, we appreciate your coming, and hopefully we can move forward.

Mr. KOZLOWSKI. Thank you, Mr. Chairman.

Senator COHEN. The hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

AIR LIFT REQUIREMENTS

Senator THURMOND. How does the Department square the fact that 120 C–17s are sufficient to meet today's lift requirements with the fact that 120 is the same number needed when our forces were forward deployed?

Dr. KAMINSKI. Our strategic lift requirements and capabilities have undergone dramatic change since the Cold War's end. The original Cold War airlift goal of 66 Million Ton-Miles/Day (MTMAE)) called for a total of 210 C–17 aircraft to thwart a Soviet invasion of Western Europe. Secretary of Defense Cheney's Major Aircraft Review in 1990 reduced this to 120, the number required to maintain the total airlift capacity at that time, about 51.5 MTM/Day. Since then, our national strategy has focused on the ability to fight two, nearly simultaneous major regional contingencies. To offset reductions in forward deployed forces, the Department is relying more on a combination of prepositioned assets and fast sealift, in addition to airlift. Airlift's vital role in deploying early units includes marrying up personnel with their prepositioned equipment. Three major mobility requirement studies since 1990 have focused on the proper mix of strategic lift capabilities to meet the National military strategy. The most current study, the Mobility Requirements Study Bottom-Up Review Update, determined that a total airlift capacity of 49.4–51.8 MTM/Day is required to support today's dual Major Regional Contingency strategy. Additional analysis recently has determined that with additional prepositioning of Army equipment, the airlift requirement is 49.7 MTM/D. Over 99 percent of this requirement will be obtained upon completion of the procurement of 120 C–17s in addition to the existing fleets of C–5s and KC–10s, plus the Civil Reserve Air Fleet.

Senator THURMOND. I understand that with the planned buy of 120 C–17s and the scheduled retirement of the C–141, the Department of Defense will be unable to meet its minimum strategic airlift requirement of 49.4 MTM/D between fiscal year 1997 and fiscal year 2004. What are the plans for addressing this shortfall?

Dr. KAMINSKI. America's strategic airlift fleet will undergo significant change as the C–141 retires and C–17s are delivered. The Department has developed a comprehensive plan that enables the Air Force to maintain, at a minimum, existing levels of strategic airlift capacity during this period. Accelerating the C–17 production schedule to the maximum affordable rate as I directed in the November 3, 1995, C–17 Non-Developmental Airlift Aircraft Acquisition Decision Memorandum has reduced the anticipated capacity gap between fiscal year 1997 and fiscal year 2004. Increased reliance on Civil Reserve Air Fleet (CRAF) commitments provides an efficient way to meet the remaining airlift shortfall; however, CRAF provides primarily bulk cargo transport without adding military utility. We successfully negotiated more than a 10 percent increase in CRAF participation this year. A note of caution—CRAF contracts are negotiated annually; therefore, future years' commitments are uncertain. Additionally it is possible to use formal school training aircraft (C–5s, C–141s, C–17s) from Altus Air Force Base, Oklahoma, as was done during Desert Shield/Desert Storm, to add military utility. Diverting these aircraft would cause some disruption to training; therefore, we would envision exercising this option only for short critical periods during the deployment. Finally, additional KC–10s could be directed to the airlift role from an air refueling role during the airlift intensive phase of a deployment. These initiatives can be implemented as needed, in whole or in part to maintain or improve existing capability.

STRATEGIC AIRLIFT REQUIREMENTS

Senator THURMOND. One of the C–17's greatest assets is its ability to deliver cargo directly to the fight. In fact, during recent deployments to Bosnia, the C–17 was relied on heavily for tactical lift. I understand that the RM&A study and the Bosnia deployment have been cited as justification of the decision to procure 120 aircraft. With a buy of only 120 aircraft what affect do simultaneous intra and intertheater lift operations have on the Air Force's ability to meet its minimum strategic lift requirements?

Dr. KAMINSKI. The C–17 provides a unique military capability because of its flexibility in both strategic and tactical roles. 12OC–17s, along with the C–5, KC–10, and Civil Reserve Air Fleet, provide the minimum strategic airlift capacity called for by the Mobility Requirements Study Bottom-Up Review Update. In the dual-Major Regional Contingency (MRC) scenario of that study, all 120 C–17s are devoted to strategic missions; any theater use would impact the strategic flow. For example, excursions were run from the dual MRC baseline removing a squadron of C–17s from the strategic deployment flow to tactical missions in the other theater. This caused a delay in delivering required personnel and equipment; however, it clearly indicated the value of the C–17 to the warfighting CINCS. Other scenarios, such as Lesser Regional Contingencies (LRC) or the post-deployment phase of a single NMC, may allow simultaneous use of the C–17 for both strategic and theater missions. Two recent studies, OSD's C–17 Tactical Utility Analysis and the Joint Staff's Intratheater Lift Analysis, indicate a high payoff from providing at least one squadron of C–17s for theater use due to its ability to move large amounts of heavy outsize cargo to forward austere locations. Depending on the greater demand, the aircraft would swing between its tactical and strategic roles.

Senator THURMOND. Dr. Kaminski, you and Secretary Perry and the Service Secretaries are to be commended for the reserve forces policies which have enabled Air Force Reserve and Air National Guard units to operate and maintain strategic airlift aircraft. Will you please provide the Committee a summary of the requirement for airlift recapitalization? Please include a description of plans to retain the balance of reserve units operating modem airlift aircraft.

Dr. KAMINSKI. The C–17 program is the centerpiece of our airlift recapitalization efforts as it replaces a C–141 fleet rapidly approaching the end of its operational service life. The capabilities and operational efficiencies provided by the C–17 allow us to replace the fleet capacity of over 240 retiring C–141s with just 120 C–17s. This smaller, more efficient airlift force, with its reduced basing and overhead support requirements, is vital to maintaining our strategic airlift capabilities in an era of declining Defense budgets. These efficiencies, however, necessitate the deactivation of several active and Air Reserve Component (ARC) units. Our efforts to balance our active and ARC units continue with the pairing of eight C–17 Reserve Associate squadrons to an equal number of active duty C–17 units. In addition, we plan to replace C–141s in the Mississippi Air National Guard at Jackson with C–17s as well. As a result, ARC personnel will make up 41 percent of the C–17 crew force, and about 50 percent of the total strategic airlift crew force by fiscal year 2006.

C–141 RETIREMENTS

Senator THURMOND. Five units of the Air Force Reserve or the Air National Guard currently help make up the C–141 airlift force. Please provide your plan for replacing the aircraft in these units as the C–141 retires.

Dr. KAMINSKI. There are currently five Air Force Reserve and two Air National Guard C–141 squadrons equipped with their own aircraft, along with the eight Reserve Associate squadrons which share aircraft with their active duty counterparts. We have already formed two of the planned eight C–17 Reserve Associate squadrons, and we plan to replace the Guard's Jackson, Mississippi C–141s with the C–17. As 240 C–141s are replaced by 120 C–17s, however, unit deactivations will take place in both the active and Air Reserve Component forces. Current plans allow just one unit-equipped reserve component C–17 unit. Nevertheless, with eight Reserve Associate and one unit-equipped Guard squadron, reserve component personnel will make up 41 percent of the C–17 crew force.

[Whereupon, at 4:35 p.m., the hearing was adjourned.]

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